

February 1947

TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office



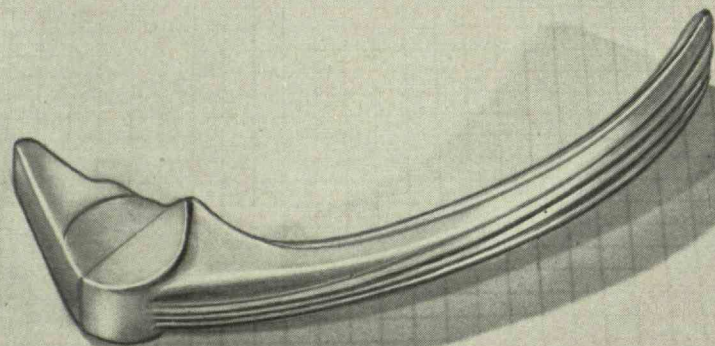
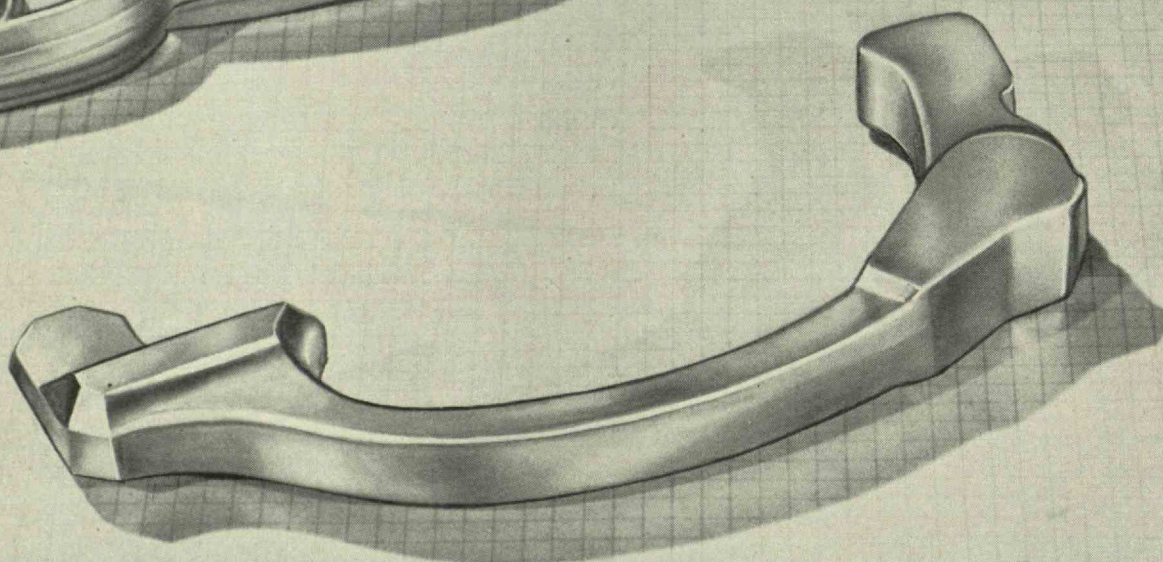
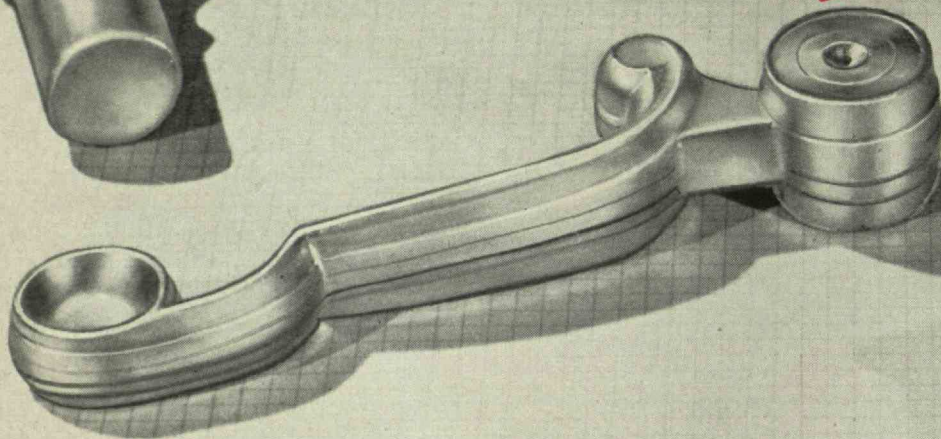
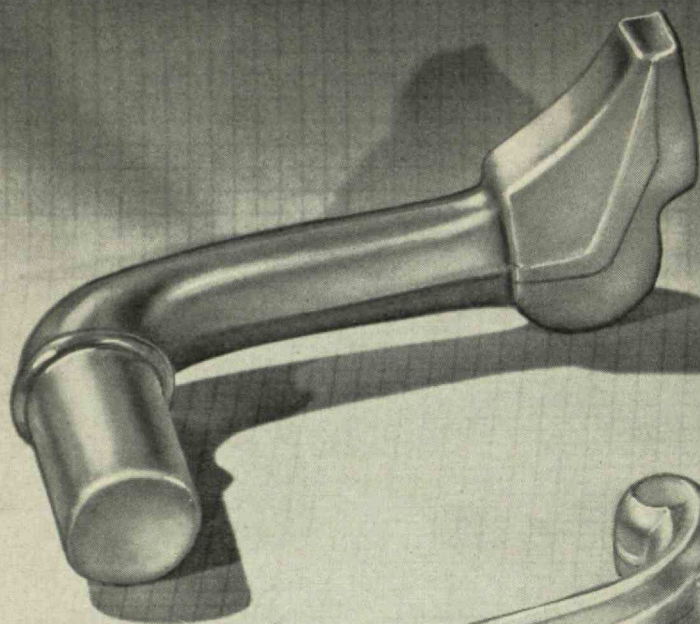
technology review

Published by MIT

This PDF is for your personal, non-commercial use only.
Distribution and use of this material are governed by copyright law.
For non-personal use, or to order multiple copies please email
permissions@technologyreview.com.

FOR LOWER COSTS AT POINTS OF ASSEMBLY

*Use
Forgings!*



HE

HARVEY

METAL CORPORATION

HAROLD B. HARVEY '05 • *Engineers & Manufacturers* • SHERRY O'BRIEN '17

74th STREET and ASHLAND AVENUE • CHICAGO 36, ILLINOIS

FORGINGS IN ALUMINUM • BRASS • BRONZE • COPPER • MAGNESIUM • MONEL • ALLOYS

MACHINING FACILITIES

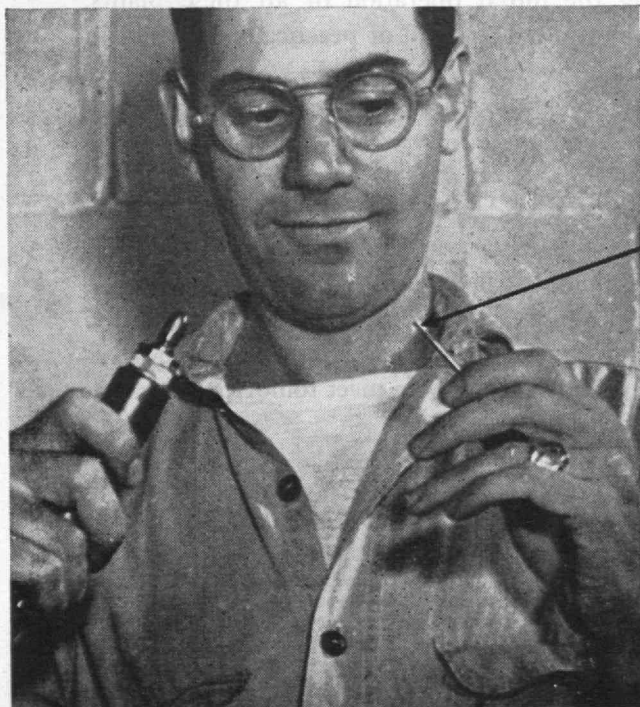
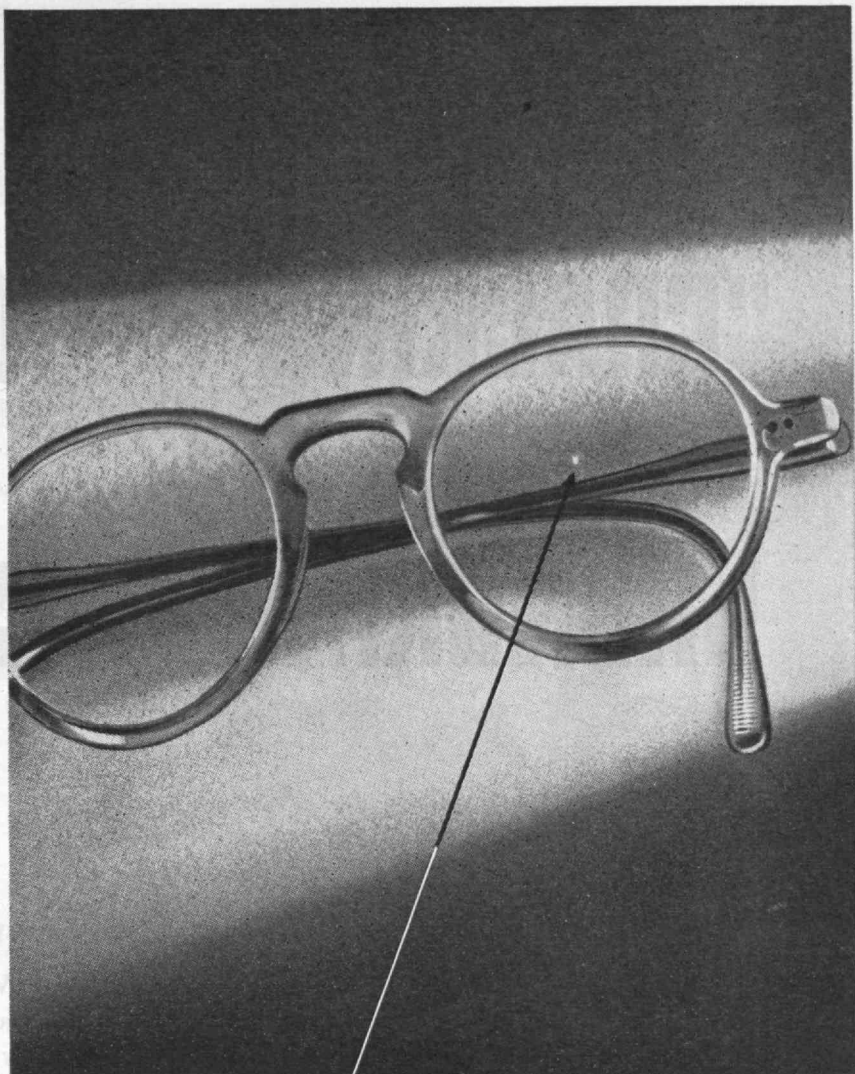


Safety Goggles

Win High Praise

from

Gem Safety Razor Corporation



"This A-O Goggle saved the eye and possibly the life of E. Steller of the Brush Department. This chip in the lens was caused by the tool-bit he holds in his hand."

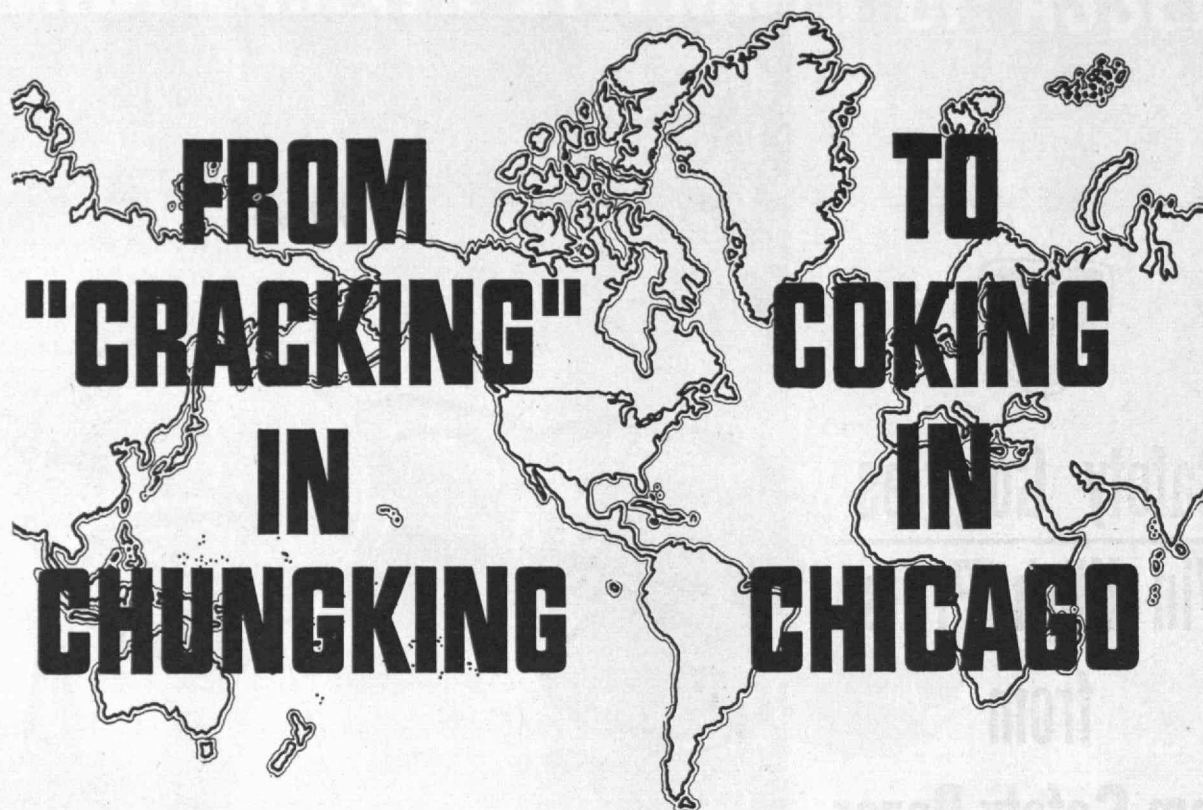
Typical records reveal that eye injuries cost (in first aid attention, idle machine charges, unproductive time and other frequently "hidden costs") \$14.60 per injured man per year. Yet 98% of these accidents (according to the verified figures of the National Society for the Prevention of Blindness) are *avoidable*—mainly through the use of Safety Goggles.

Can you afford to overlook this opportunity to lower your production costs?

Send to your nearest A-O Safety Representative or direct to American Optical Company, Box T for a copy of the new book, "Eye Accident Costs," telling how to prevent them and how much you can save by preventing them.

American  Optical
COMPANY
Safety Division

SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL CITIES



**... LUMMUS has acquired
a world of refining know-how**

From here to China . . . from Venezuela to the U.S.S.R. . . . more than 600 Lummus-built petroleum and chemical plants are delivering high yields of high-quality products. In designing, constructing, and supervising the initial operation of all these plants, Lummus literally has acquired a world of practical experience in every phase of petroleum refining.

Many Lummus-built plants have established records for *long initial runs* — the forerunners of *outstanding performance in the long run*.

Whatever direction your refinery plans are taking, Lummus has the know-how — plus the laboratory, pilot-plant, engineering, and construction facilities — to help translate them into profits. Lummus engineers will appreciate an opportunity to discuss the desirability of studying your refinery, to determine what modernization or expansion will be necessary to meet tomorrow's market requirements.

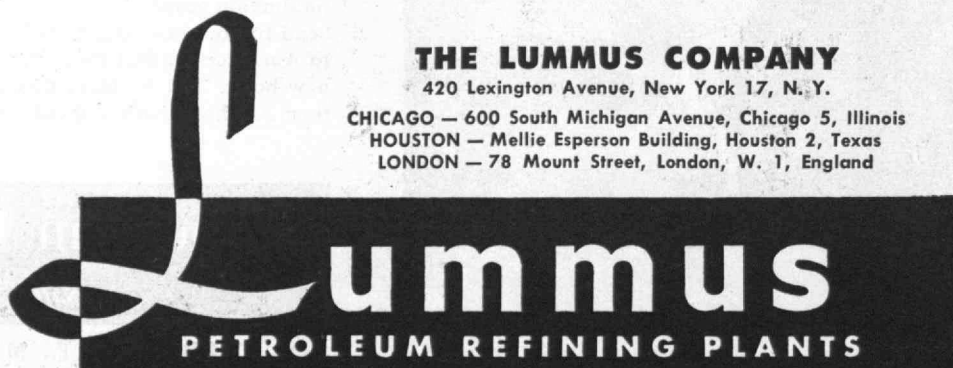
THE LUMMUS COMPANY

420 Lexington Avenue, New York 17, N. Y.

CHICAGO — 600 South Michigan Avenue, Chicago 5, Illinois

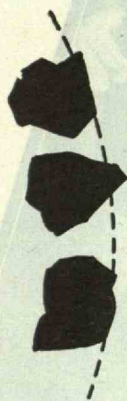
HOUSTON — Mellie Esperson Building, Houston 2, Texas

LONDON — 78 Mount Street, London, W. 1, England




Here's Why

32 ALUNDUM Grinding Wheels Are Showing Such Startling Results



When ordinary abrasives are crushed to size it results in many grains with flat sides. When such grains are bonded into a wheel it is often a flat side that is exposed in the surface instead of a useful cutting point.



No crushing to size is necessary, however, with 32 ALUNDUM abrasive. The grains form as individual crystals—pointed on all sides. No matter how they are bonded into a wheel one or more cutting points are exposed. And they are longer-lasting cutting points because they are over 99% pure fused alumina.

The greater number of longer-lasting cutting points doing the work means that a 32 ALUNDUM grinding wheel removes stock more rapidly. Because grinding heat is spread over more points, and points that stay sharp longer, "32" wheels cut cooler. Because there are more points doing the work and points that don't dull quickly, 32 ALUNDUM wheels require fewer dressings and last longer.

Ask your Norton abrasive engineer for Vectograph Demonstration

Norton Company, Worcester 6, Mass.



NORTON ABRASIVES



NATIONAL RADIO PRODUCTS 1947

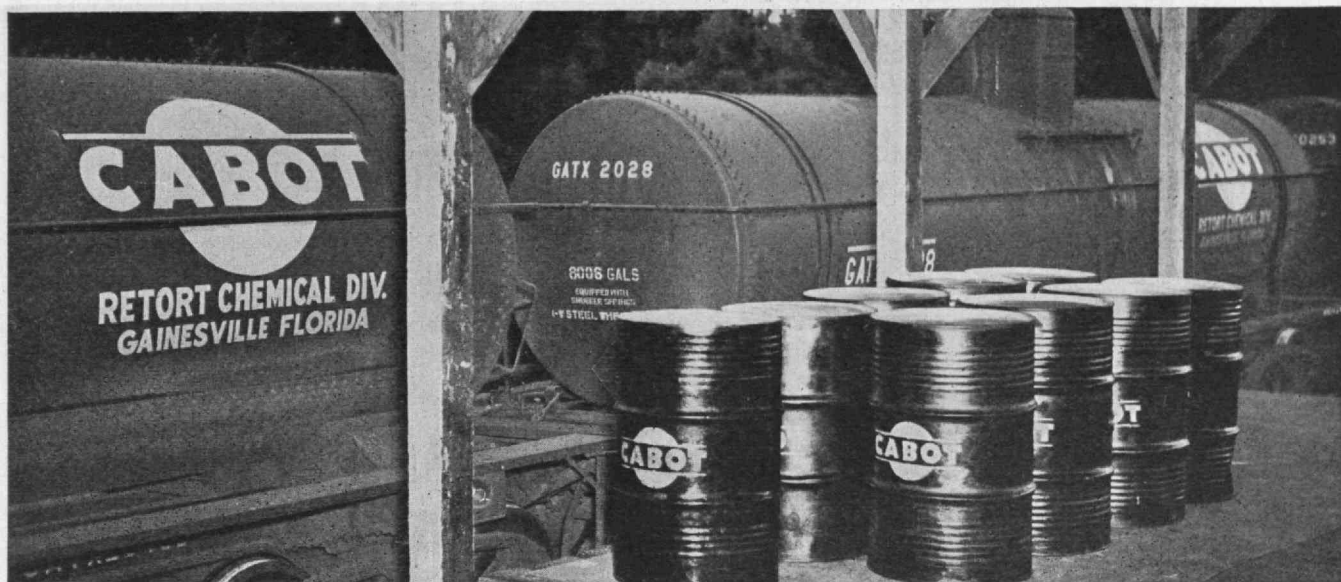
THE NEW 1947 CATALOGUE

The new National Catalogue describes hundreds of parts designed for amateur use. Many items are new, some are unique. The old favorites are there, proved and improved over the years. New or old, the products in the new National Catalogue will improve your rig.

CATALOG NO. 700

NATIONAL COMPANY, INC.
MALDEN, MASSACHUSETTS, U.S.A.





FOR INDUSTRY

Raw materials of the Cabot Companies meet many essential needs of industry.

The Retort Chemical Division of the Cabot Carbon Company is an example. In Florida, Retort takes the stumps of the timberlands and extracts pine tar, an essential in rubber compounds and a protective coating on cordage both ashore and on the nets of our fishing fleets.

The charcoal is used in the molds of the metallurgical industry.

Cabot Companies utilize many other natural resources which might otherwise be wasted. In the oil fields, so-called "sour" natural gas, with a high sulphur content, first is stripped of natural gasoline to enrich the nation's motor fuel. Then the gas is burned in Cabot plants to manufacture carbon black for rubber, paints, varnishes, lacquers, inks and plastics.

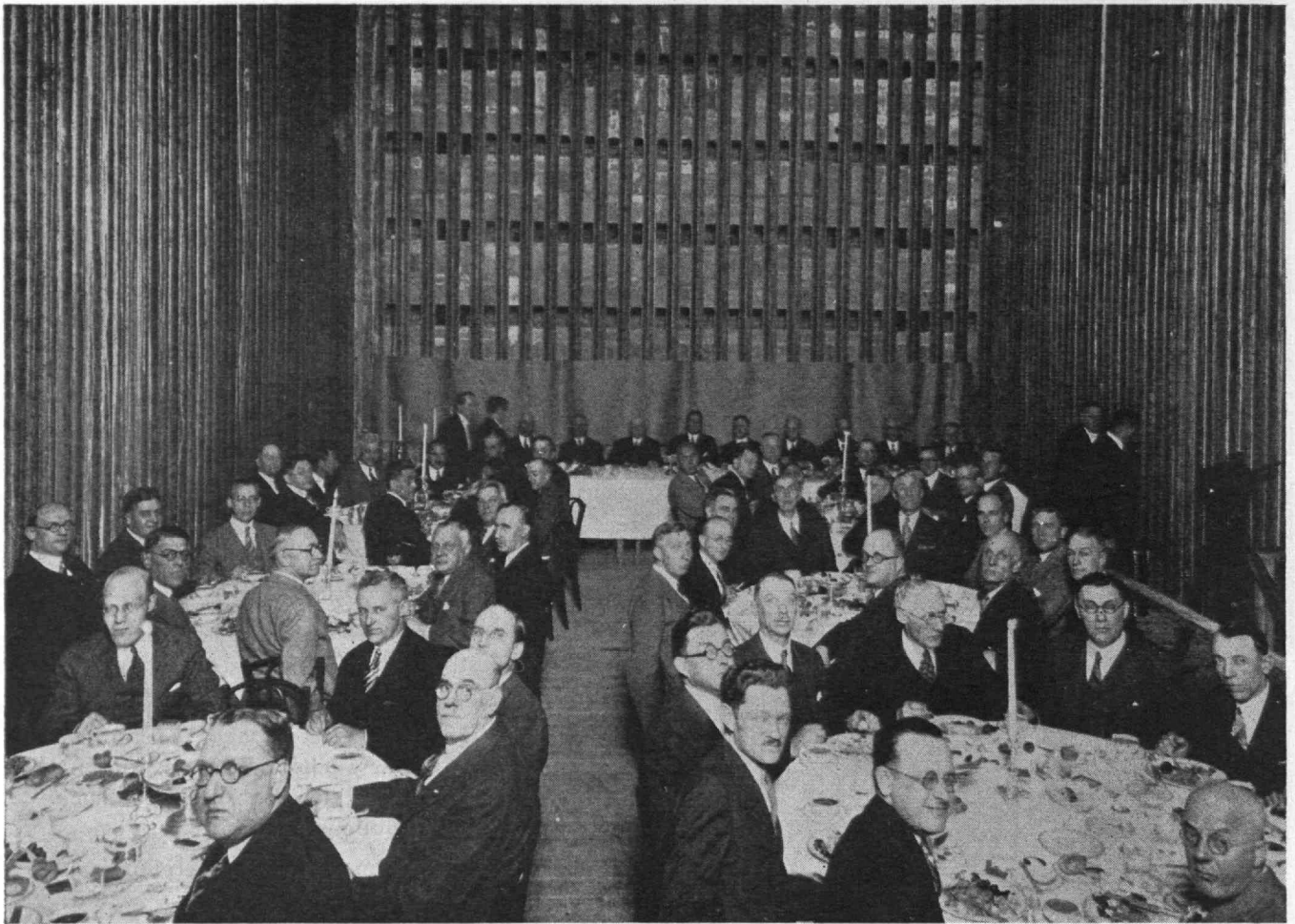
Carbon Black
Natural Gas
Natural Gasoline
Pumping Equipment
Pine Tar
Charcoal
Carotene
Chlorophyll

CABOT CARBON CO.
TEXAS ELF CARBON CO.
GENERAL ATLAS CARBON CO.
CABOT SHOPS, INC.
VALLEY VITAMINS, INC.



GODFREY L. CABOT, INC.

77 FRANKLIN STREET • BOSTON 10, MASS.



WORLD'S FIRST *million-pound boiler!*

At noon on December 2, 1929, ninety people lunched in a room which a few hours later had an average temperature of about 2500 deg. Fahr. Steel tubes formed the walls. 85 feet overhead were the dim outlines of huge drums. This improvised dining room was the furnace of the first boiler unit to produce a million pounds of steam per hour, and the luncheon celebrated the completion of three such units in the East River Station of the CONSOLIDATED EDISON COMPANY OF NEW YORK.

This unusual event marked a notable step forward in the economics of steam and power generation. A million-pound boiler costs substantially less to install and operate than two half-million pound units. Yet, until the East River installation — designed and built by Combustion Engineering — had demonstrated that a million-pound output from a single boiler was practical, there had been only one plant in the country with boilers capable of producing even half a million pounds. Now there are many installations for capacities above 500,000 pounds and, in the million-pound class, there are twelve units in service and four on order. Of these sixteen, eleven are Combustion Engineering designed.

The spectacular comparisons given below may help you to visualize a million-pound boiler, probably the biggest single production unit you'll find anywhere in industry. Combustion Engineering is proud of the engineering resources and manufacturing facilities that enabled it to build the first million-pound boiler — and a majority of those that followed it. And these same resources and facilities are available to you when you select *any* C-E Steam Generating Unit, small or large.

• A typical million-pound boiler is about ten stories high. • It's as wide as a four-lane highway. • The space in 5 six-room houses would just fill its furnace. • In one hour it burns 45 tons of coal, pulverized to the fineness of flour, with nearly 90 per cent efficiency. • The steam it produces would be sufficient to heat ten thousand average homes.

B-106

COMBUSTION ENGINEERING

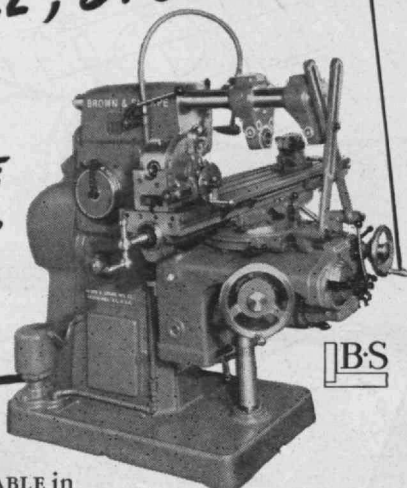
200 Madison Avenue

New York 16, N. Y.

C-E installations cover all steam generating requirements from 30 horsepower stoker-fired boilers to the largest power station units.

SIMPLE, STURDY

EASY
TO
OPERATE
Light Type
Milling
Machines



BS

AVAILABLE in

Universal, Plain and Vertical
Types . . . easy to set up and maintain, they
have a wide range of speeds and feeds . . .
long service and low maintenance cost. (No. 2
Universal Light Type illustrated.) Complete
details and specifications on request. Brown &
Sharpe Mfg. Co., Providence 1, R. I.

BROWN & SHARPE

INTER-OFFICE MEMO

To: PLANT ENGINEER

Subject: PLANT RENOVATIONS

Secure services of experienced
construction company with rep-
utation for quality-responsibil-
ity—and low cost.

From: PLANT MANAGER

HORN BROTHERS

Incorporated

Building Construction

23 MINER STREET • BOSTON, MASS.

G. ARTHUR HORN, Treas.
Spec. Student '37

A. B. ELLENWOOD, JR. '34

THE TABULAR VIEW

Resplendent Trio.—SIR EDWARD V. APPLETON, Secretary of the Department of Scientific and Industrial Research in England, emphasizes (page 211) the benefits which may be expected from the close co-operation of the triumvirate of science, industry, and government. Representing virtually the complete text of the first Arthur Dehon Little Memorial Lecture delivered at Walker Memorial on November 19, 1946, "Science, Industry, and Government" acquaints us with the co-operative research carried on by the industrial research associations in England. Sir Edward's message has further significance, however, not alone because of the important place which scientific research occupies in our highly industrialized civilization; it is significant as an expression of international good will between scientists in all parts of the world. Sir Edward's distinguished career is chronicled on page 165 of the January, 1947, issue of *The Review*.

Research Lubricant.—Firm believer in, and active fighter for, the American way of life, ROBERT E. WILSON, '16, chairman of the board of Standard Oil Company of Indiana, Life Member of the M.I.T. Corporation, and 1943 Perkin medalist of the American Chemical Society, sets forth (page 217) convincing arguments for conducting industrial research in an atmosphere unhampered by restrictions. Dr. Wilson advances cogent reasons for believing that well-trained man power, freedom of opportunity, and the incentive of natural rewards for achievement are the factors most likely to insure continuance of the brilliant performance of science in promoting this nation's welfare. After postponing publication until Dr. Wilson was able to present it as an address at the Princeton Bicentennial Conference, *The Review* is happy to bring to its readers "Incentives for Research."

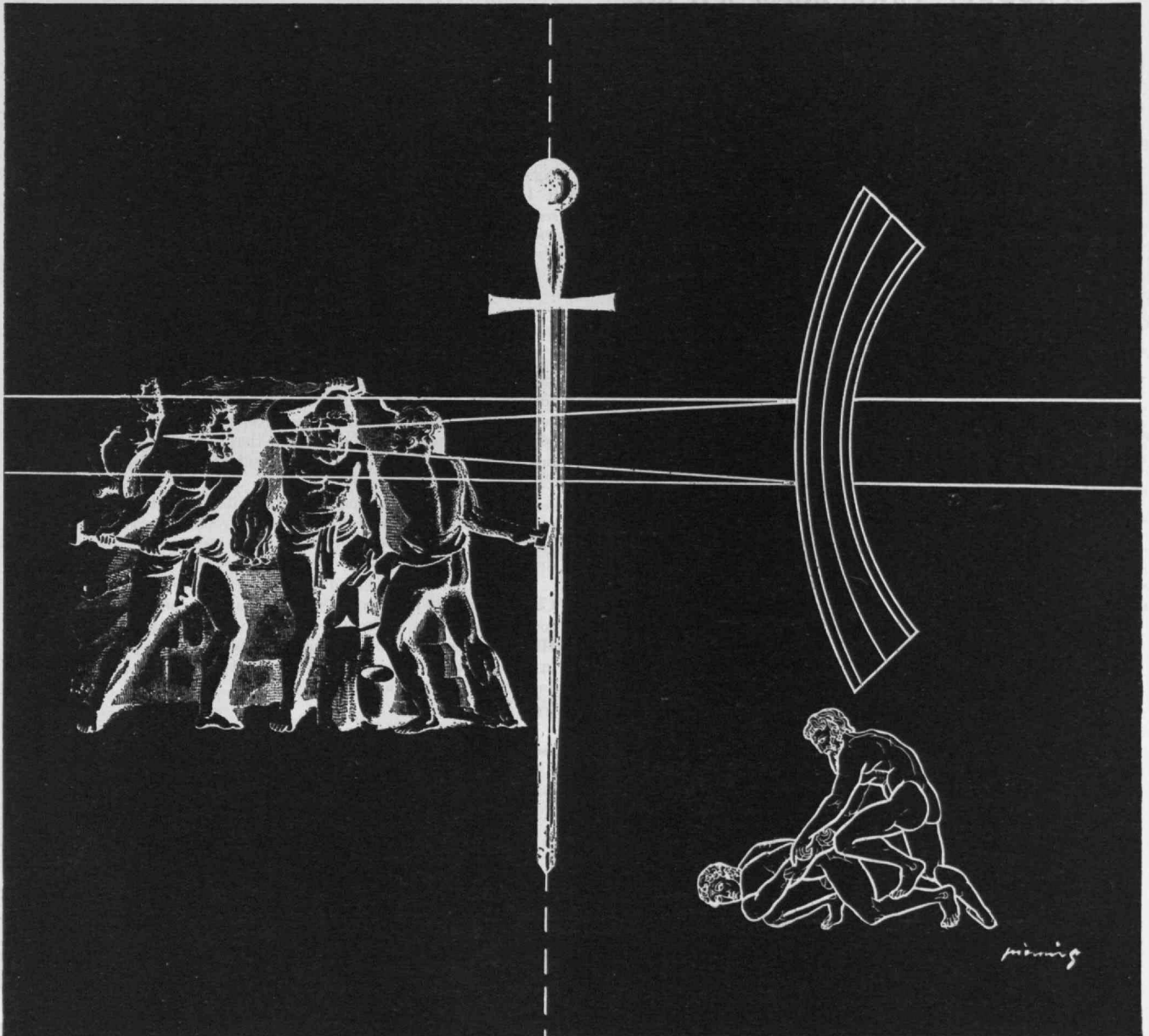
Diversify to Progress.—Looking askance at systems of regimentation, and even those customs and trends tending to produce uniformity in humans, PROFESSOR HENRY B. PHILLIPS, head of the Department of Mathematics, takes up the cudgels for individualism (page 220) in "Diversity and Progress," originally given as his presidential address at the M.I.T. Chapter of Sigma Xi. As a confirmed optimist, Professor Phillips expects local diversity to provide that leadership needed for future progress. After graduation from Erskine College in 1900, Professor Phillips received his degree of doctor of philosophy from Johns Hopkins University in 1905. He has been a member of the Department of Mathematics since 1907, its head since 1935, and is well known as author of several textbooks and mathematical papers.

Proposal.—After graduation from the Baltimore Polytechnic Institute in 1935, RICHARD A. NOVAK received a degree from the Institute in 1939 as a graduate of Course XV. During 1939–1940, he was teaching fellow at St. John's College in Annapolis, and since 1940 has been in the Aircraft Gas Turbine Engineering Division of the General Electric Company at Lynn, Mass. His interest in writing and in cultural aspects of education are reflected (page 221) in "Humanities in an Engineering School."

ONE CAME BACK

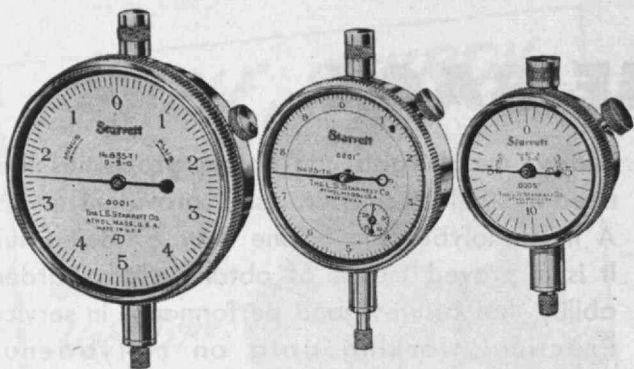
One of the legends surrounding the making of Damascus sword blades is that the smiths developed a delayed quench consisting of thrusting the heated blade into the body of a slave. This gave the required properties, but it was prodigal of manpower, and inconvenient besides. The smith usually had to leave town to do his heat treating in quiet.

Today, metallurgists can obtain properties they need in steel by simpler, less improvident means. A little molybdenum is one way of doing this. It is a proved means of obtaining the hardenability that assures good performance in service. Practical working data on molybdenum steels are available from Climax upon request.



MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"
CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

Climax Molybdenum Company
500 Fifth Avenue • New York City



STARRETT DIAL INDICATORS

For any type, size, range, or style of graduation, see new Starrett Dial Indicator Catalog "L". Write for your copy.

Buy Through Your Distributor

THE L. S. STARRETT CO.

Athol, Massachusetts, U. S. A.

WORLD'S GREATEST TOOLMAKERS



STARRETT

PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK
HACKSAWS • BAND SAWS FOR CUTTING METAL, WOOD, PLASTICS

PRECISION — THAT'S THE REASON

Precision in production—that's the reason Diefendorf Gears can be depended upon for superior performance and longer life. From drawing board to finished product—Diefendorf Gears are precision engineered all the way.

Every Diefendorf Gear is engineered for its particular job.

Diefendorf Gear Corp.
D. W. Diefendorf '30, President
Syracuse 1, New York

diefendorf
★★★★★ **GEARS**

MAIL RETURNS

Objection to "Minority Report"

FROM ROBERT E. WILSON, '16:

While I am a believer in free speech even when I don't like it, I do not like to see *The Technology Review* print, without comment or challenge, a statement such as that on page 62 of the November, 1946, issue, where Tenney Davis comments: "Under such circumstances the use of the atomic bomb was like kicking a man who was down, slapping a prisoner already shackled, a needless display of bravado." I believe President Compton's analysis of this matter in the current *Atlantic Monthly* is a complete answer to this viewpoint, and should certainly be given prominence in your next issue.

Chicago 80, Ill.

Quotation

FROM FRANK EGNER:

Thanks ever so much for sending me the November, 1946, issue of *The Technology Review* containing the article which deals with the philosophies of libraries by John E. Burchard '23. This is a most searching study of the pressing library problem and I am mighty glad to have it. I want to keep it around for constant reference and quotation. It seems to me this is the best summary of the situation I have ever seen.

President, Funk and Wagnalls Company

New York 10, N. Y.

Bazooka Precursor

FROM MARTIN MANN, '41:

Willy Ley, certainly an authority on rockets (he was a prominent early member of the German Society for Space Travel, which later, absorbed into the Wehrmacht, produced the V-2), presented a very interesting historical analysis of their development in the December, 1946, issue of *The Review*. It is unfortunate that he neglected to mention that one belligerent in World War I *did* recognize the potentialities of rockets, i.e., the United States.

The Ordnance Department tested, quite successfully, the precursor of the present bazooka. Unfortunately for rocket research, the date was November 10, 1918, one day before the Armistice, and the project was dropped.

This weapon was invented by the late Dr. Robert H. Goddard, the Clark University physics professor who laid the foundations for modern rocket engineering. It remained for Dr. Goddard's assistant, Dr. C. N. Hickman, now of the Bell Telephone Laboratories, to pick up this work in World War II and direct development of the weapons listed at the end of Mr. Ley's article.

New York 10, N. Y.

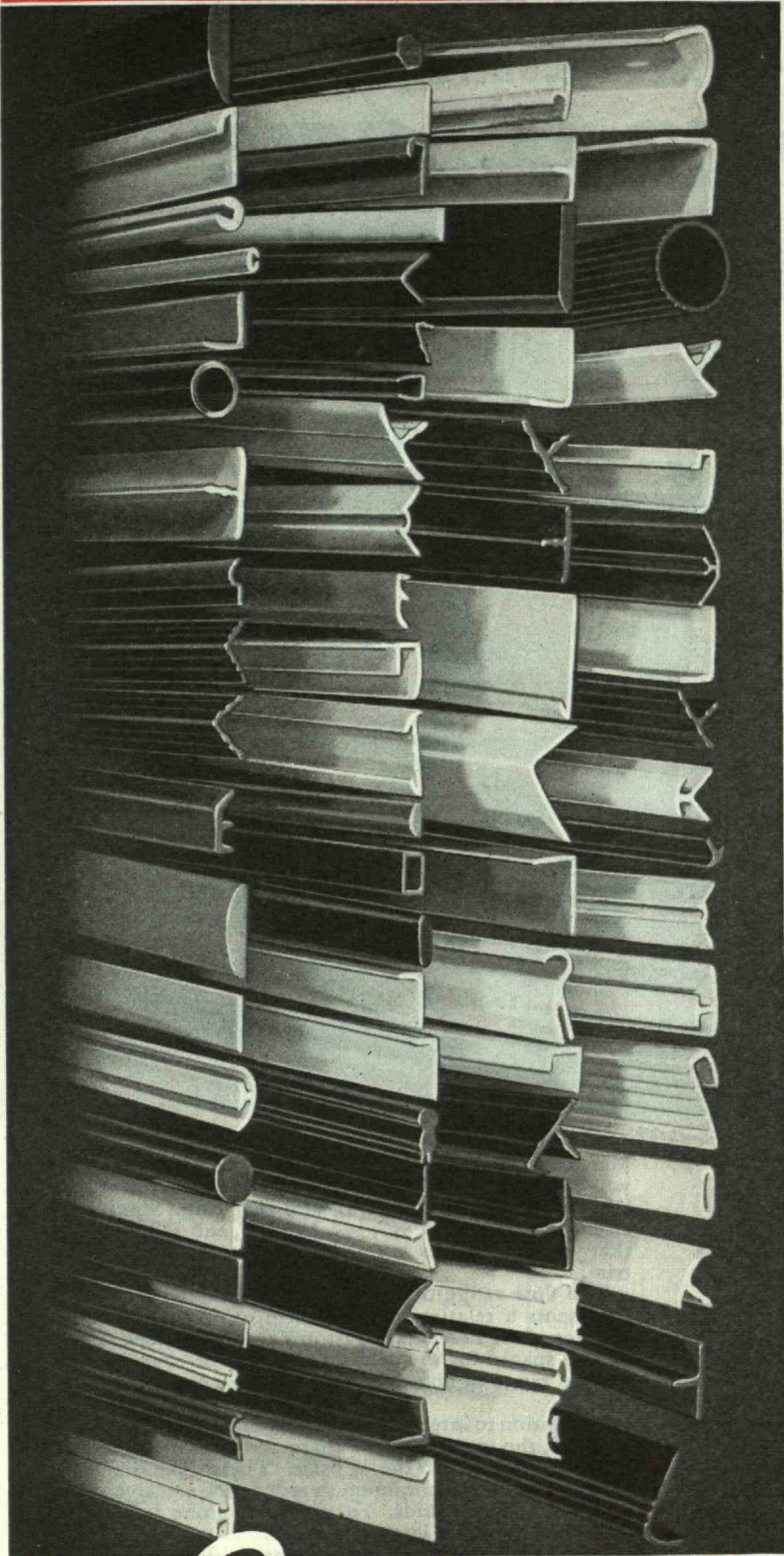
Speed with Economy

**We are now working on
our 22nd contract for
AIR REDUCTION COMPANY**

whom we have had the pleasure
of serving since 1938

W. J. BARNEY CORPORATION
101 PARK AVENUE, NEW YORK
INDUSTRIAL CONSTRUCTION

Alfred T. Glasett '20, Vice President



FOR SOUNDLY ENGINEERED EXTRUDED PLASTIC SECTIONS

ASK
Sandee

INDUSTRY everywhere has learned to depend upon Sandee Extruded Plastics. For here, only plastic materials of the finest quality are used. These, together with far advanced extrusion techniques and our experienced application engineering are continuing to expand uses of sound Industrial Extruded Plastics.

Sandee offers valuable aid in..1. Selecting the *correct* plastic material, 2. Developing the most efficient design for appearance, strength and economy, 3. Applying a degree of plastic extrusion "know-how" unsurpassed in the history of the industry! Sandee successfully extrudes large heavy sections as well as rods, tubes and smaller sections. Among the materials offered are, Polystyrene, Plexene, Vinyls, Ethyl Cellulose, Cellulose Acetate Butyrate, High Acetyl, Cellulose Acetate, Styraloy, and the Acrylics.

If a soundly engineered Extruded Plastic section is involved, by all means get the benefit of Sandee research, experience, and exclusive, greatly enlarged production facilities. Write today for complete information.



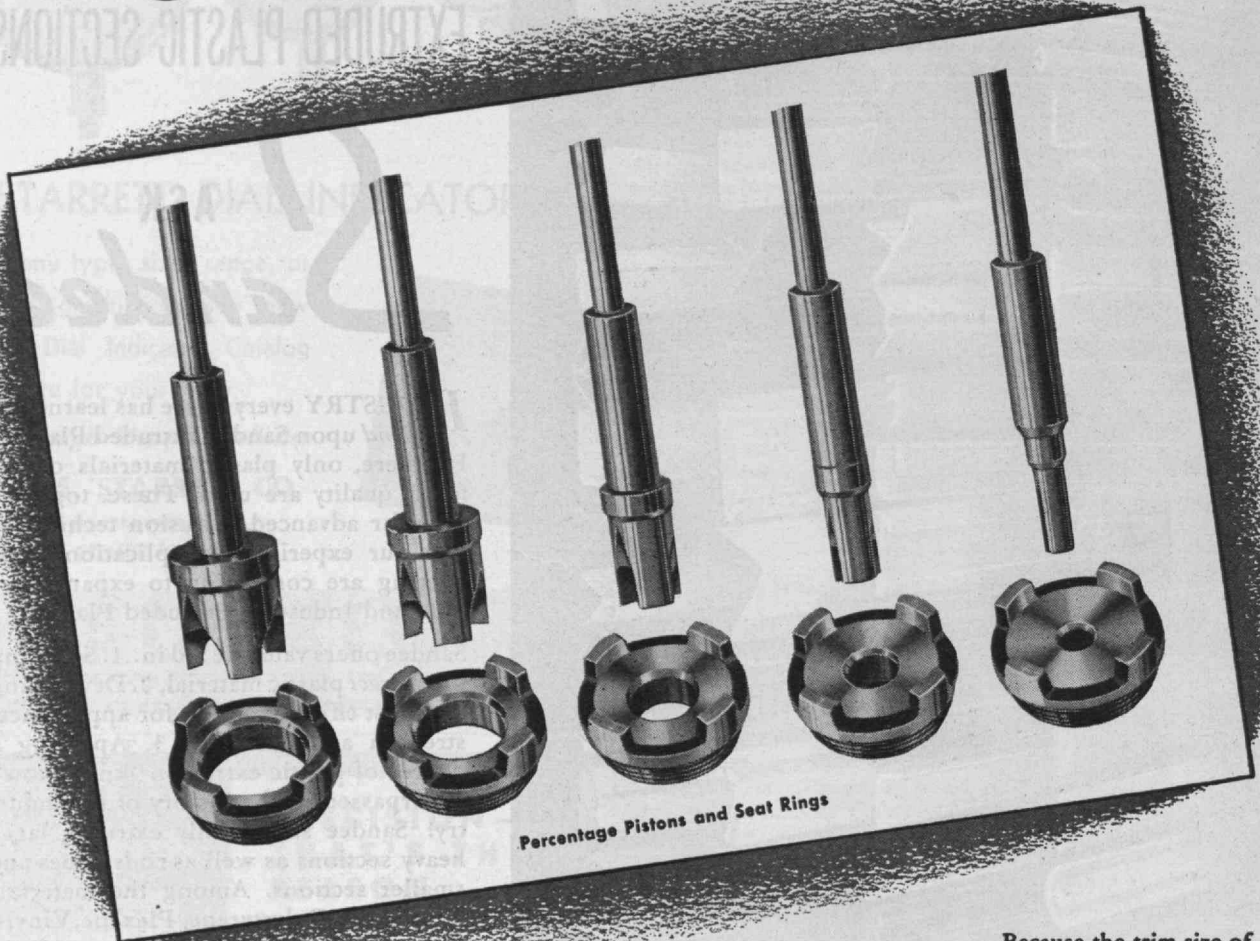
SALES REPRESENTATIVES IN 19 PRINCIPAL CITIES

Sandee Manufacturing Company

5050 FOSTER AVENUE • CHICAGO 30, ILLINOIS

EXTRUDED PLASTICS AND SPECIAL TOOLS

The Interchangeable Plug and Seat Ring in Masoneilan Percentage Piston Control Valves Gives You **5 VALVES IN ONE**

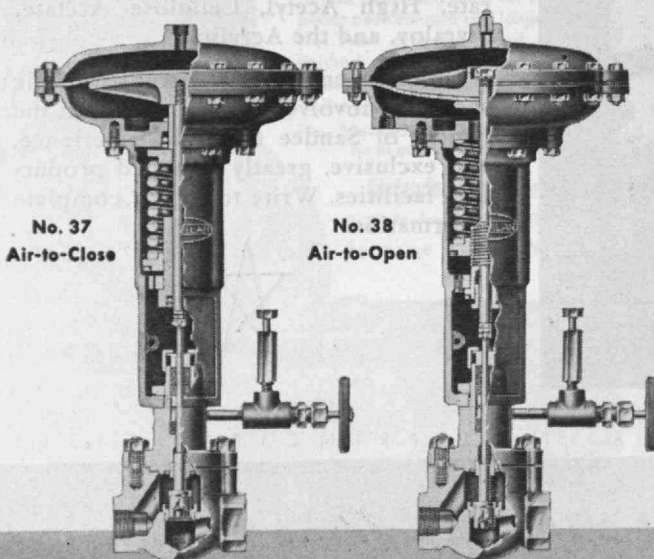


Because the trim size of Masoneilan Percentage Piston Valves is interchangeable, you can easily change any valve from one size to another by merely replacing the plug and seat ring. Since trim sizes are available in $\frac{3}{4}$ ", $\frac{1}{2}$ ", $\frac{3}{8}$ ", $\frac{1}{4}$ ", and $\frac{1}{8}$ ", it means that you get 5 valves in one by simple conversion of the trim.

The flow range of orifice sizes of from $\frac{3}{4}$ to $\frac{1}{8}$ inch represents a relative capacity ratio of 36 to 1. The capacities of the Percentage Piston Valves have been selected and spaced for the primary purpose of covering the desired range of flow with the minimum number of trim sizes.

In addition to interchangeable trim, these control valves give you the excellent flow characteristics of larger size valves even down to the $\frac{1}{8}$ " size. The orifice diameter has been held to a minimum to reduce the erosive effect of high velocity fluids. Forged steel globe type body provides unusually large capacity.

Investigate Masoneilan Percentage Piston Control Valves. Catalog 301 gives complete information on construction, characteristics, selection and other important data. Write for your copy.



MASON-NEILAN REGULATOR COMPANY

1190 Adams Street, Boston 24, Mass., U. S. A.

New York • Buffalo • Chicago • St. Louis • Philadelphia • Houston • Pittsburgh • Cleveland • Tulsa
Atlanta • Los Angeles • San Francisco • Mason Regulator Company of Canada, Ltd., Montreal and Toronto

"Without laboratories men of science are soldiers without arms"—LOUIS PASTEUR



Why some things get better all the time

THE SPAN OF LIFE is increasing. Within the last half century the average length of life of a new born infant has increased over 30%. And many more people over 40 can now expect to live well into their seventies.

Among the reasons for this progress, along with notable advancements made by the medical profession, are the improvements in medicinals and medical equipment that help guard life.

Synthetic organic chemicals now are used in the production of a host of pharmaceuticals, including penicillin and the sulfa drugs, which have accomplished wonders in the fight against germs. They also are used in repellents to defeat disease-carrying insects. Out of research with gases has come oxygen therapy, an aid to recovery in numerous illnesses. Research with metals and alloys has produced the gleaming, easy-to-clean stainless steel used in modern hospital and medical equipment.

In safeguarding life—just as in transportation and communications—much of man's progress is traceable to *better materials*.

Producing better materials for the use of industry and the benefit of mankind is the work of UNION CARBIDE.

Basic knowledge and persistent research are required, particularly in the fields of science and engineering. Working with extremes of heat and cold—frequently as high as 6000° or as low as 300° below zero, Fahrenheit—and with vacuums and great pressures, Units of UCC now separate or combine nearly one-half of the many elements of the earth.

UNION CARBIDE AND CARBON CORPORATION

30 EAST 42ND STREET **UCC** NEW YORK 17, N. Y.

Products of Divisions and Units include

LINDE OXYGEN • PREST-O-LITE ACETYLENE • PYROFAX GAS • BAKELITE, KRENE, AND VINYLITE PLASTICS
ACHESON ELECTRODES • EVEREADY FLASHLIGHTS AND BATTERIES • NATIONAL CARBONS
PRESTONE AND TREK ANTI-FREEZES • ELECTROMET ALLOYS AND METALS • HAYNES STELLITE ALLOYS • SYNTHETIC ORGANIC CHEMICALS



Four words that build better tires

ANOTHER REASON FOR GOODYEAR LEADERSHIP

When it comes to voting for a product leader, the polls never close. Ballots are cast day in and day out by people buying the product that offers them the highest quality, the greatest satisfaction.

For 32 straight years, the decision of motorists everywhere has been the same — *that Goodyear Tires are the best tires made.*

Such leadership must be protected . . . for you don't stay *first* unless you're *best*. Keeping Goodyear Tires first is the personal responsibility of every man and woman in the vast Goodyear organization.

That's why you see the four words — "Protect our good Name" — on the walls of Goodyear factories and offices the world over. They are a constant reminder of that great responsibility.

Zealous guarding of Goodyear's reputation pays off to the motoring public with superior tire performance on the road. Every Goodyear Tire must be a leader in value — in longer wear and greater safety. This is another reason why it's true today — as it has been for so many years — "More people ride on Goodyear Tires than on any other kind!"

A pioneer in rubber, Goodyear also works with metals, fabrics, chemicals, plastics and other materials . . . making all Goodyear products better today than they were yesterday, better tomorrow than they are today.



THE GREATEST NAME IN RUBBER

THE TECHNOLOGY REVIEW

TITLE REGISTERED U. S. PATENT OFFICE

EDITED

AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

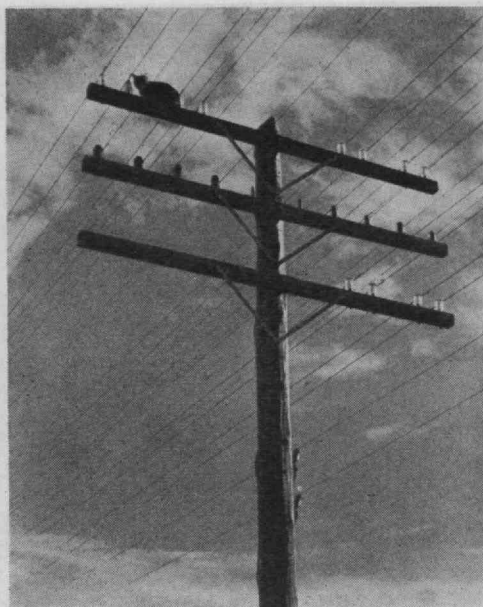


Photo by H. Armstrong Roberts

"I want to be alone!"

CONTENTS for FEBRUARY, 1947

THE COVER — MASSACHUSETTS INSTITUTE OF TECHNOLOGY

From a photograph by Sargent Collier

SNOW ON "THE HILL"	FRONTISPIECE	208
SCIENCE, INDUSTRY, AND GOVERNMENT	BY SIR EDWARD V. APPLETON	211
<i>Organization of Research for the Common Good in England</i>		
INCENTIVES FOR RESEARCH	BY ROBERT E. WILSON	217
<i>Free Enterprise Maximizes the Benefits of Scientific Research</i>		
DIVERSITY AND PROGRESS	BY HENRY B. PHILLIPS	220
<i>Major Defect of Central Control Schemes is Failure to Provide Diversity</i>		
HUMANITIES IN AN ENGINEERING SCHOOL	BY RICHARD A. NOVAK	221
<i>A Proposal for a Scientific Approach to Nonscientific Topics</i>		

☆ ☆ ☆

THE TABULAR VIEW	200
<i>Contributors and Contributions</i>	
MAIL RETURNS	202
<i>Letters from Review Readers</i>	
THE TREND OF AFFAIRS	209
<i>News of Science and Engineering</i>	
THE INSTITUTE GAZETTE	223
<i>Relating to the Massachusetts Institute of Technology</i>	

Published monthly from November to July inclusive on the twenty-seventh of the month preceding the date of issue, at 50 cents a copy. Annual subscription, \$3.50; Canadian and foreign subscription, \$4.00. Published for the Alumni Association of the M.I.T.: Alfred P. Sloan, Jr., Honorary President; Harold Bugbee, President; H. E. Lobdell, Executive Vice-president; Alf K. Berle, C. George Dandrow, Vice-presidents; Charles E. Locke, Secretary; Ralph T. Jope, Treasurer. Published at the Rumford Press, 10 Ferry Street, Concord, N. H. Editorial Office, Room 7-203, Massachusetts Institute of Technology, Cambridge 39, Mass. Entered as second-class mail matter at the post office at Concord, N. H. Copyright, 1947, by the Alumni Association of the Massachusetts Institute of Technology. Three weeks must be allowed to effect changes of address, for which both old and new addresses should be given.

Publisher • H. E. LOBDELL

PAUL COHEN
T. L. DAVIS
F. G. FASSETT, JR.

Editor • B. DUDLEY

Editorial Associates
J. R. KILLIAN, JR. P. M. MORSE
WILLY LEY F. W. NORDSIEK

Business Manager • R. T. JOPE

J. J. ROWLANDS
E. R. SCHWARZ
D. O. WOODBURY

Staff { Editorial: THEODORA KEITH, RUTH KING
Business: MADELINE R. MCCORMICK



Photo by Acme

Snow on "The Hill"

THE TECHNOLOGY REVIEW

Vol. 49, No. 4



February, 1947

The Trend of Affairs

Avocados and Fresh Herring

BY sea the journey would have taken six weeks, and chances of illness or death would have been high. So the pedigreed calf was flown from Miami, Fla., to Bogotá, Colombia. More recently, a flock of more than 33,000 baby chicks were flown from Oakland, Calif., to Manila in the Philippines with a mortality that was reported lower than would be expected for chicks that stayed on the ground. There have been many other examples lately of situations in which the airplane, in spite of its high cost per ton mile, is the preferred and, in fact, the economic means of transport.

Yeast, a highly perishable commodity in the tropics, is being air shipped in 5,000-pound lots in South America and the Caribbean area. While the speed of plane transport is an obvious and powerful argument for its use in handling foods in the tropics, it also appears to have cooler pastures to exploit. Experimental flights of fresh fish fillets from Norway to France and Switzerland are being made, the fish arriving at the markets of Paris and Zurich on the same day that they leave Trondheim.

Decidedly less experimental is the movement by plane of about 1,000,000 pounds or one-fifth of Cuba's 1946 summer crop of avocados to the United States. Bananas have also been shipped north by air. A scarcity of shipping space on merchant vessels has no doubt accelerated the trend, but there appears to be a permanent market for high quality, tree-ripened fruit flown in from the tropics. Not only does the tree-ripened fruit have a better flavor (and perhaps greater nutritional value), but the elimination of any ripening costs and a reduction in spoilage offset to some degree the higher freight rates of the plane.

In some cases, terrain or other obstacles give air transport a virtual monopoly. A typical case is the flying in of mining equipment and supplies to isolated regions. A recent example is the air line which has been established between Reyes and La Paz, both in Bolivia, although the

former town lies at an altitude of 1,400 feet and has been cut off for all practical trade purposes by the great peaks of the Cordillera from the capital city lying at an altitude of 13,430 feet. Now La Paz is getting fresh meat from Reyes in an hour and a half. Incidentally, the refrigeration equipment necessary to establish this practice on a permanent basis is being flown into Reyes.

Electronic Excerpts

IN the United States, some 1,000 broadcasting stations daily grind out grist for more than 50,000,000 receiving sets in the nation. Electrical manufacturers produce more than 100,000,000 electron tubes annually to keep these sets in suitable operation. But the task of producing electronic equipment requires good brains, and lots of them. The research laboratory of one large electrical manufacturing company includes 3,000 books, 2,000 pamphlets, and 3,500 bound volumes of periodicals, all relating to electronics.

Radio receivers are back on the market in sufficient number to meet the peak demands. Instead of reflecting the quality which was built into wartime sets, many of the receivers appear to be below prewar standards for such sets. But good equipment is available too, if you can afford it. One domestic radio set was advertised in the *New York Times* at \$1,024.50. Foreign made, deluxe receivers, advertised in the same newspaper, bear prices of from \$1,495 to \$2,500. It is enticing to speculate on the high quality of program material which would be required to make such equipment a home necessity.

In contrast to the mechanical system proposed for several years by the Columbia Broadcasting System, an all-electronic system of color television has been announced by the Radio Corporation of America who add that commercial use of the new color system is at least five years in the future.

Of more immediate interest is the prediction that production of custom-built television receivers (complete



Photo by Vachon from Standard Oil Co. (N. J.)

with automatic record-changing phonograph and amplitude-modulated, and frequency-modulated, radio receivers) may be 100 sets per month during the early part of this year. Viewing screens, on which will be produced black and white images, will vary from 9 x 12 inches to 18 x 24 inches. Those who attend the midwinter meeting of the Alumni of Metropolitan Boston at Walker Memorial on February 8 will see such equipment in operation.

Horse-Radish and Histamine

THE annual hay fever season never fails to bring forth in the popular press an alleged new remedy for that widespread and aggravating form of allergy. Some years the suggested remedies have been as simple and unsophisticated as the sniffing of freshly grated horse-radish; but hay fever news stories last summer were complex and generally inconclusive, because they featured new drugs designed to relieve allergies through antihistamine effects, and therefore involved reporters in the histamine theory of allergy, which on the whole appeared to baffle them.

That histamine, the principal factor in this theory, is always present in all tissues of the human body is not surprising, because histamine is derived directly from the amino acid histidine, a protein constituent found in foods. The histamine theory holds that when sensitive persons ingest or inhale substances called "allergens" a flood of histamine is released within the body, producing symptoms varying all the way from the respiratory discomforts of hay fever to skin reactions, such as hives. From this postulate that allergens and histamine are both links in the chain of allergic reactions, it follows that such reactions should be preventable by severing the chain at either link. Sometimes the allergen may be excluded, as by avoiding the eating of an offending food, or by going to a region where an offending plant pollen is

not found. Or "specific" desensitization may be attempted by repeated injections of small, but increasing, amounts of the guilty allergen, in the hope of establishing a tolerance for that substance.

To break the histamine link of the allergen-histamine sequence, "non-specific" desensitization has been essayed by administration of series of histamine injections. Also, the enzyme histaminase, which destroys histamine, has been used; histaminase occurs in high concentration in the kidneys, and desiccated hog kidney is a preparation administered orally for histaminase therapy. Finally, there are the new drugs thought to possess antihistamine activity, including those recently featured in the newspapers, benadryl, pyribenzamine, and anthallan.

Histamine was identified and its chemical nature established in 1909; its physiological functions have been explored steadily ever since. Those functions that have been attributed to histamine include effects upon circulation, such as contraction of certain major blood vessels and increased permeability of blood-vessel walls. Also concerned with the blood stream is a postulated effect of histamine upon white blood cells in local inflammation. With relation to the digestive tract, some research workers have concluded that histamine increases the quantity of digestive juices secreted in the stomach, and also increases the acidity of these gastric fluids. Most arresting of the functions attributed to histamine is a role in cutaneous pain, where histamine is thought to act as a chemical mediator, being released from skin tissue by painful physical stimuli, such as cutting or heat, to act as a chemical stimulus upon sensory nerve endings. Finally, there is the histamine theory of allergy, as outlined in this discussion. But this explanation of allergic reactions is nothing more than a theory, and the other biological functions attributed to histamine are not only widely scattered and unrelated, but also are the subject of considerable controversy among physiologists.

Science, Industry, and Government

England's Utilization of Research on a National Scale Is Topic of First Arthur Dehon Little Memorial Lecture

BY SIR EDWARD V. APPLETON

THE proper direction of scientific effort and the proper application of the results of such effort are, I believe, among the most important challenges of our time. It seems to be typical of any postwar period that fundamental matters come under fresh scrutiny and fearless examination, and it is surely a good thing that this should be so. Stimulated by the realization of the magnificent services rendered by scientists in support of the Allied forces during the war, science and its consequences have become a matter of interest to the ordinary citizen. It is no new thing to the thoughtful mind that science has practical and social consequences. What is new is that the general public is now sharply aware of them. As a prominent newspaper man recently expressed it to me, "Science is news, as never before."

Now I think it can be said that this awakening to the importance of scientific work on the part of the public has been due in large measure to the fact that events move fast during war and the four stages of research, development, production, and use follow so rapidly on the heels of one another that the practical consequence of scientific effort is clear for all to see. The public has naturally concluded that if science can solve so many of the problems of wartime, it should play a similar role in solving the problems of peace. The problems that confront us now are, in an ultimate analysis, the provision of work, homes, food, health and safety — safety from aggression — for all; and these problems depend for their solution on the maintenance, in some degree, of the same kind of partnership between government, science, and industry which grew up during the war.

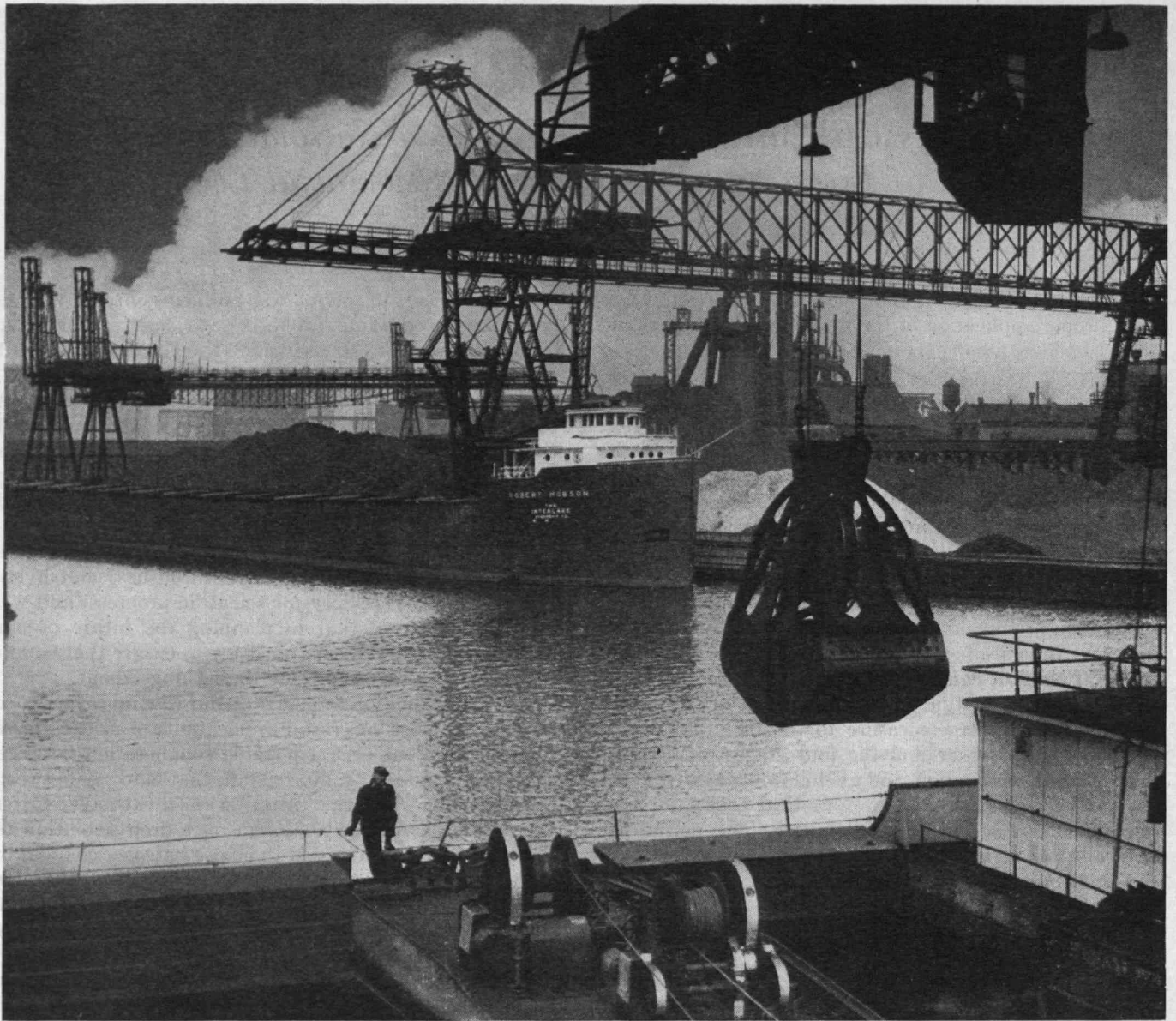
In approaching the problem of the future it may be helpful to cast a brief glance at the war years which have just passed, for I feel that we can draw certain lessons from that experience. In Britain the whole of our scientific man power was registered in 1939 and debarred from entering the Armed Forces without special permission. There was thus a reservoir of trained people for recruitment to the research establishments serving the Navy, Army, Air Force, and Civil Defense organizations. But even then the recruitment did not take place indiscriminately. The general policy adopted was not to recruit men from industrial research teams in industry. These teams were left practically intact. But in the case of university workers, who are generally more accustomed to work singly or in small groups, no such attempt was made; indeed an opposite policy was adopted. The result was that the research establishments of the services were strengthened by the addition of many brilliant minds from the universities, while the research teams in industry were ready to attack, as composite units, the problems allotted to them.

One of the most striking results of our wartime experience has been the brilliant success of our university

research workers in solving war problems entirely remote from their peacetime interests. Various reasons have been advanced for their success. It has been pointed out that they had fresh minds. It has also been stated that, in approaching a difficult task, "they didn't know it couldn't be done." It has further been claimed that they had a better background of fundamental principles than the majority of those with whom they worked. I do not profess to be able to assign the result to any one of these causes. But what cannot be doubted is that university conditions certainly do, somehow, generally insure the maintenance of mental adventurousness and lively imagination so necessary for scientific progress; and we, in Britain, believe that in planning the future of our Scientific Civil Service we must try to ensure that conditions are encouraged to bring these things about.

Another deduction I make from our wartime experience is that the most successful applications of science have resulted from the closest possible collaboration between the scientist and the military staff, that is to say between the "provider" and the "user." Your great naval writer Rear Admiral Alfred T. Mahan once drew attention to the long period which used to elapse between changes of weapons and the consequent changes of tactics. He attributed this lag to "the inertia of a conservative class." Fortunately we can be satisfied that, in the war that has just ended, such gaps have not been unduly long. This has been due not only to the close collaboration between scientist and service man, but also to the fact that in many cases scientists have assisted their service colleagues in working out plans for the use of new weapons, and have been able to make post-mortem analysis of operational results whereby to check these plans. The field in which the scientist can usefully operate extends far beyond that of the laboratory.

My third comment on our wartime experience relates to subject matter. We have seen a mighty effort resulting in outstanding developments in weapons and instruments, culminating in the atomic bomb. By no means has all this effort been wasted, even if judged solely by its peacetime scientific interest and importance. But in this intensive drive many inviting scientific avenues have had to be merely noticed and passed by. When fundamental work has had to be done, as in the case of nuclear physics or in radio wave propagation, it has necessarily had to be objective in character and relevant to the major target. What I may call free fundamental work — free in the sense that its selection is dictated solely by man's curiosity — has been almost wholly in abeyance. We cannot recognize the return of peace in any better way than by changing all that. Our priorities must be revised. In many fields we have been living on our scientific capital which now stands urgently in need of replenishment. For this purpose the British Govern-



William M. Rittase

ment has set its own priorities, for the time being, as regards the release of scientific staff from government service in the following order: (1) universities and fundamental research; (2) civil science, government and industrial; (3) defense science. This is a complete reversal of the priorities which obtained in wartime.

Civil Science

In turning now to the future we note that, as in most countries, scientific research in Britain is, in the main, carried out by three types of organizations which differ somewhat in motives and objectives. These three organizations are universities, governmental agencies, and industrial research laboratories.

Universities and like institutions carry out what I shall call free fundamental research. If I may use the graphic expression of Dr. Vannevar Bush, '16, such educational institutions may be said to extend the endless frontiers of knowledge. This type of research, the result of intellectual curiosity and the love of truth for its own sake, is carried out without regard to any immediate or future useful application.

Government establishments carry out what may be called objective fundamental research and also applied

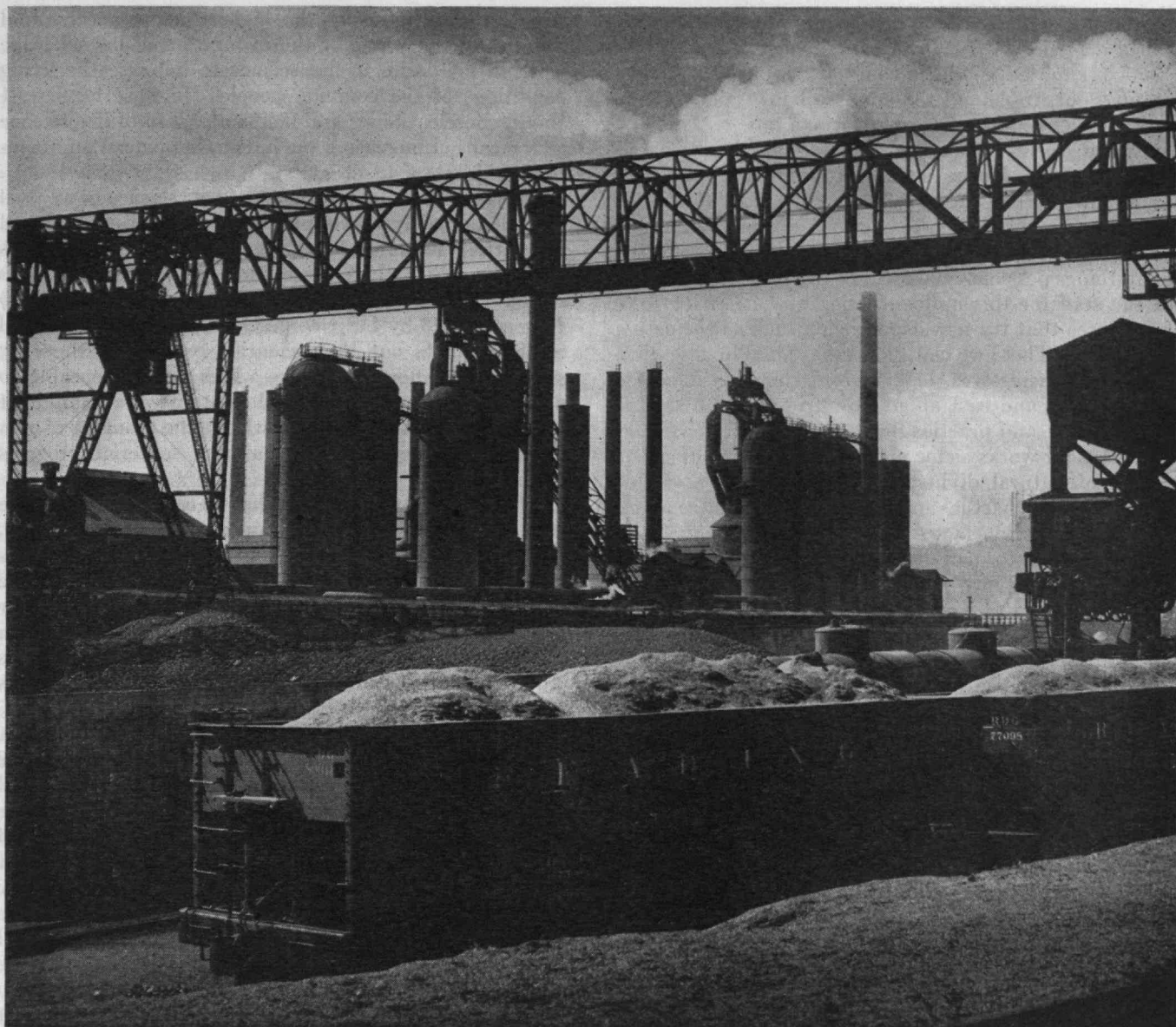
research. By objective fundamental research is meant research designed to give insight and understanding rather than any special immediate practical result. It is called objective because it is relevant to some field of practical importance.

Industrial research laboratories carry out mainly applied research. In enlightened firms, a certain amount of objective fundamental research is also accomplished.

There is no sharp differentiation between the three groups of free fundamental, objective fundamental, and applied, research. However, I do find these divisions a more convenient classification than the older division into "pure" and "applied" research which always had, to my mind, the suggestion of snobbishness about it.

University Science

It is a remarkable fact that scientific research in the universities is of relatively modern growth. Scientific research, as we know it today, began in the Seventeenth Century when the experimental method replaced the method of *ex-cathedra* statement or argument by which, since the Middle Ages, man had endeavored to find truth. The scientific method of inquiring by observation, theory, and experiment has often been attributed to



William M. Kittase

Francis Bacon, though my own view is that Dr. William Gilbert, the physician of Queen Elizabeth and Fellow of my own College, St. John's at Cambridge, has a stronger claim to be counted its author. But the teaching of the experimental method did not form part of the university curriculum in the Seventeenth and Eighteenth Centuries, and laboratories did not form part of university equipment. Early in the Nineteenth Century, however, teaching laboratories for science were instituted and research became a spare-time activity of professors and lecturers. From small beginnings this has developed until it is now an accepted part of university tradition that teachers of scientific knowledge should also advance that knowledge. Moreover, although carried out in a spirit of pure inquiry, this free fundamental research has shown a surprising capacity for being useful.

Then we also look to our universities not only to make science but to train makers of science. We look to them for the supply of trained scientific workers who will later occupy positions in university, government, and industrial laboratories. We find that this training in research is best accomplished by a senior research worker acting as supervisor to a group of research students which should not be large.

We must never forget the outstanding importance of the exceptional man in this respect. Most of the really great advances in science have been accomplished by small teams of workers of this kind led by a man with ideas. As one concerned, to some extent, with the organization and support of science in Britain, I believe that a vital task is to see that these leaders — these men with ideas and inspiration — lack neither disciples, assistants, or equipment. When such needs have been satisfied the leaders should be left alone.

Government Science

Even apart from defense research, government in Great Britain conducts a great deal of research that perhaps would be regarded in the United States as being primarily the responsibility of industry or other bodies. Here we definitely enter the utilitarian field.

Though their object was, in the main, the satisfaction of their disinterested intellectual curiosity, the natural philosophers of the Seventeenth Century easily recognized that the results of their experiments could lead to important applications. Not only did they appreciate the importance of what Bacon called *experimenta lucifera*, experiments of light, which illuminate our knowledge of

the nature of things, but they also appreciated what he called *experimenta fructifera*, experiments of fruit, which yielded knowledge which could be applied, as Bacon pointed out, to extend the empire of man and to ameliorate the condition of man which he regarded as wretched. In his *New Atlantis* Bacon described what he calls Salomon's House, a kind of national research laboratory which had the object of arriving at "the knowledge of causes, the secret motions of things, and the enlarging of the bounds of human empire, to the effecting of all things possible." You will be interested to note that of the staff for this national laboratory he writes "We have three that try new experiments such as themselves think good. These we call Pioneers. . . . We have three that bend themselves, looking into the experiments of their fellows and cast about how to draw out of them things of use and practice for man's life and knowledge, as well as for works as for plain demonstration of causes, means of natural divinations and the easy and clear discovery of the virtues and parts of bodies. These we call Craftsmen or Benefactors. . . . Lastly we have three that raise the former discoveries by experiments into greater observations, axioms and aphorisms. These we call Interpreters of Nature."

Somewhat later, the scholarly Boyle, too, discoursed largely on the usefulness of the experimental natural philosophy, pointing out the usefulness of mechanical disciplines to natural philosophy and how the goods of mankind may be increased by the naturalist's insight into trades, and of doing by physical knowledge what is wont to require manual skill.

The close of the Eighteenth Century brought from America to Great Britain and Europe that singularly gifted secretary, general, and statesman, Benjamin Thomson, Count Rumford, who, while making several purely

scientific discoveries of the highest importance, found practically the whole of the inspiration of his scientific work in his desire to use science to improve the living conditions of the common people. He was the first, I think, conscientiously and deliberately, to utilize science as a means of increasing the health, happiness, and comfort of his fellow man.

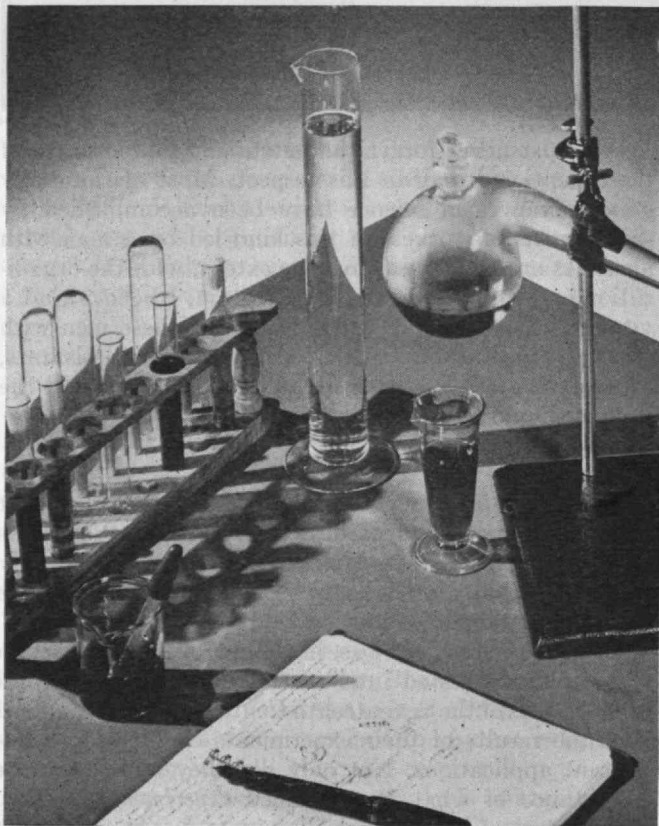
During the Nineteenth Century science was still studied primarily for its purely intellectual interest and very little was heard of the potentially useful applications of science. Still there were some who recognized this realm. A most interesting article in the *Fortnightly Review* in 1873 by Dr. George Gore, Fellow of the Royal Society, points out that scientific research is the only source of the new knowledge which is indispensable to national progress. His article contains the significant thought that without new knowledge the thoughts of men run in circles and intellectual and material progress ceases.

After calling attention to, what he calls, the deplorable lack of support given to fundamental scientific research, Gore proposed that there should be formed state laboratories for original research. In the course of his article he quotes a number of examples of what we would now call gaps in our fundamental knowledge and also a number of scientific problems whose solution he claims would be of great value to industry. Many of the problems he mentions have now been solved.

In his suggestion for state laboratories he is somewhat troubled about the need to insure that, with no set duties beyond instruction to carry out research, a man would not become idle. His ideas would raise a smile in these days for he writes: "Men who had previously exercised the degree of self-sacrifice necessary to make a number of long and difficult experimental researches, with only very limited pecuniary means, must necessarily be possessed of great enthusiasm in their calling, and would therefore be extremely unlikely persons to become idle by being supplied with a sufficiency only of means to carry on their labours. Further, such men might at present easily obtain a much larger income than they would receive in such a post, by abandoning research and devoting themselves to the various profitable engagements which are open to every man of scientific ability who is willing to devote himself to applied science. The practical work of research is much too arduous and difficult to permit such an office to become an object of desire to a place-seeking or idle person. But in order to exclude with certainty those who might hereafter devote themselves to research solely or primarily for the purpose of obtaining a well-paid appointment, and to ensure in all cases a reasonable continuance of industry, it would be necessary, that whilst the salaries paid should be sufficient to render the professors free from care, if expended with a reasonable degree of economy, they should not be so large as to conduce to idleness."

Research for the British Government

Very little notice seems to have been paid to these advocates of state assistance in the prosecution of research for the national benefit in Great Britain until the National Physical Laboratory was founded with Government assistance in 1900. It was set up largely as a result of the efforts of the late Lord Rayleigh who



A. Devaney, Inc.

realized earlier than most how the progress of modern industry depended to an ever increasing extent on accurate measurements and precise knowledge of the properties of materials.

It required the impact of the first World War, however, seriously to awaken the British Government to the necessity for State action in regard to scientific research and, as a result, in 1915 the Department of Scientific and Industrial Research was established as a separate Department of State, under the Lord President of the Council who is advised by an Advisory Council. The Department of Scientific and Industrial Research is not, of course, concerned with the whole field of science. Agricultural research and medical research are dealt with by sister organizations, also under the Lord President. There are, naturally, scientific experts in the ministries responsible for defense, trade, food, health, fuel, transport, and so on, so that there has been no attempt to confine scientific knowledge to one ministry alone since it has to be applied by many.

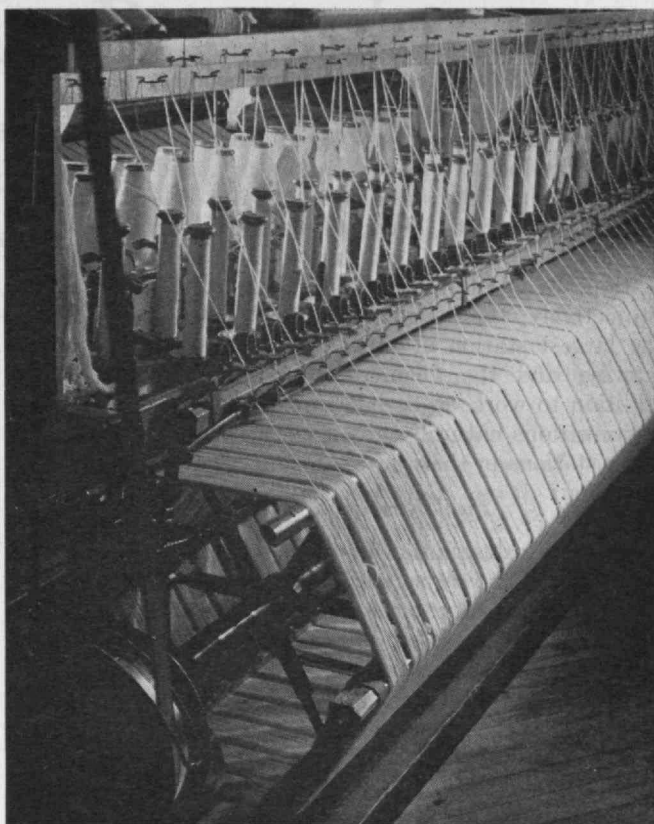
The major part of government civil research in the sphere of physical, chemical, and industrial interest is, however, centered in a group of 10 research organizations under the Department of Scientific and Industrial Research (D.S.I.R.) through which an attempt is made to provide a central scientific service for the executive departments of government and also to carry out research on matters of common interest to industry and to the community as a whole. That is the first function of the Department. The second is the encouragement of research by industry itself, particularly by fostering the formation of co-operative research associations. By means of grants, free fundamental research of timeliness and promise in the universities in Great Britain is promoted, and effort is expended to provide an adequate supply of trained research workers by means of maintenance allowances.

The Advisory Council advises the Lord President on all the Department's research activities and expenditure, which now is running at the rate of £3,000,000 per year. The Advisory Council is composed of men who have an expert knowledge of science or of industry and who serve in their purely personal capacity and not as representatives of any particular organizations to which they belong. When first formed, the Advisory Council was one of the first bodies composed of men outside government to advise on policy for implementation inside government. Individual members of the Advisory Council retire after five years' service.

In addition to the Advisory Council we have a research board or committee to advise on the work on each of our research organizations. Each board or committee is, again, composed of independent members who are chosen by the Lord President for their special knowledge and experience. Thus, by way of our various advisory bodies, our university and industrial scientists and our industrial leaders exercise a direct influence on the activities of the Department.

Governmental Research Establishments

The full list of the Department's stations includes: National Physical Laboratory, Building Research Station, Chemical Research Laboratory, Food Investigation Organization (dealing with the storage and preservation of food), Forest Products Research Laboratory, Fuel Research Station, Geological Survey, Pest Infestation of



William M. Rittase

Stored Products, Road Research Laboratory, and Water Pollution Research Laboratory. The problems which these research laboratories attack — as may be surmised by the names given the laboratories — are, of course, current. Still, the basic overall need is one of considerably longer standing than might first be supposed.

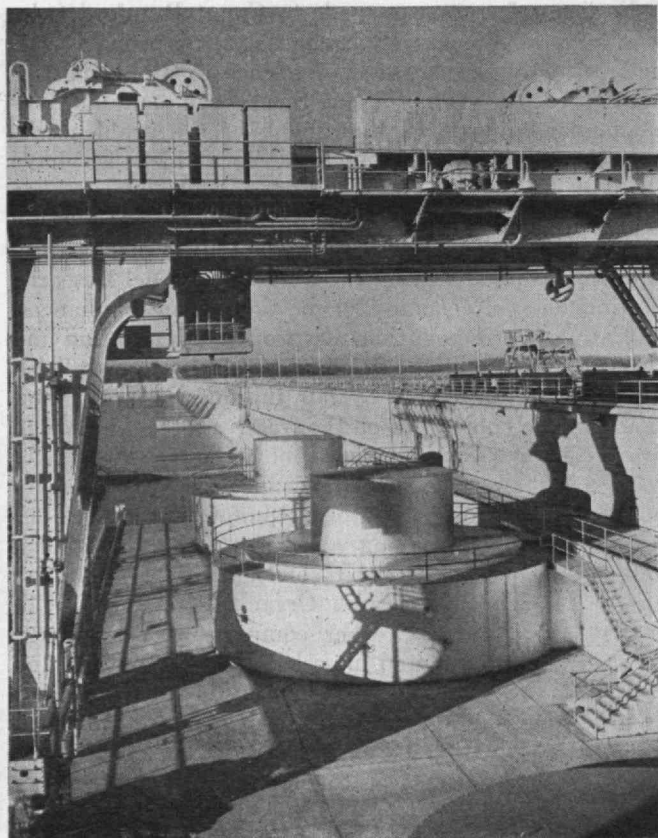
Earlier, reference was made to Count Rumford (who was born at Woburn, Massachusetts) as probably the first to apply the methods of science to problems connected with the primary domestic needs of mankind. It is a singular coincidence that many of the problems he investigated are precisely those for which we have thought it desirable to set up special laboratories. For example, his work on the economy of fuel, on the design of kitchen stoves, and on the reduction of smoke from chimneys is paralleled by the work of our Fuel Research Station on fuel economy, domestic heating appliances, and atmospheric pollution. His work on ventilation and the comfort conditions in rooms is similarly paralleled by projects undertaken by our Building Research Station. Similarly, his work on the tractive force required to draw carriages having wheels of various widths over roads of different types has connection with that of our Road Research Laboratory. Rumford also carried out research on food, paying attention to its nutritional value, its economy, and its efficient preparation; we also have a Food Research Organization. Finally, although there may be other comparisons which have escaped me, he invented his celebrated photometer and carried out researches on the lighting of rooms and the design of lighting fittings, activities which are continued today at the National Physical Laboratory. If we ever thought of adopting a patron for our Department, we should find it difficult to overlook Rumford's claim to that position!

Now I think it is important to note that our research stations, which seek to advance knowledge of community interest, are differentiated according to objectives. Therefore we have a Building Research Station, a Road Research Laboratory, a Fuel Research Laboratory, a Forest Products Research Laboratory, and so on. The staff of each of the stations is constituted as a balanced team of physicists, chemists, engineers, architects, biologists, and others according to the objective of the station. In addition, there are three stations organized subjectively, the National Physical Laboratory (by far the largest station of the Department), the Geological Survey, and the Chemical Research Laboratory. In addition to work on their own extensive program, these organizations naturally give specialist services to all the other stations in their own subjects.

Fuel Research Activities

Because a description of the work of all our stations could easily be wearisome, I shall select only one station as an example for brief comment, namely, the Fuel Research Station. This station was established shortly after World War I as a national research center for the study of fuel problems. Its work has included investigations on the carbonization of coal at high and low temperatures to improve the processes of manufacturing solid smokeless fuel, and gas and liquid fuels; on hydrogenation and other processes for the production of fuel oils from coal; on fundamental work dealing with the chemical constitution of coal itself. Work has also been carried out on the cleaning and storage of coal, and on the design of burners of gas and pulverized fuel.

A most important section of work at the present time is that of the National Coal Survey, which is conducted at nine laboratories of the various coal fields, with its



H. Armstrong Roberts

headquarters at the Fuel Research Station. The purpose of the Survey is to determine the physical and chemical properties of our coals both as they occur in seams in the ground and as prepared for the market. On the basis of the data collected it is possible to indicate the most suitable uses of the different coals and to predict with considerable accuracy the probable properties of coal in seams that are as yet unworked.

The Coal Survey, in conjunction with the Geological Survey collaborates with the Coal Commission and the Ministry of Fuel and Power in assessing our national reserves of coal, which since 1942 have belonged to the nation. It will be seen that the data collected by the survey are essential in the planning of future mining operations if we are to use our not unlimited resources to the best advantage.

Recently the Fuel Research Station has intensified its research work in connection with domestic heating and atmospheric pollution. One of the major problems facing the country in the immediate postwar period, that of housing, has provided opportunities for great improvements in domestic heating. The Station has been called upon to assist the ministries concerned by testing appliances and advising on problems concerned with fuel for the home. Not least among these problems is that of reducing smoke emission.

In addition to work in its own field on the more efficient use of fuel, during the war the Fuel Research Station has dealt with such problems as the development of flame-thrower fuels and the design of gas-producers to enable road transport to operate on indigenous fuels. It has also developed a simple and effective method for preventing the emission of smoke by ships at sea, based on modification of the doors of marine boilers. This work should have important applications to land boilers in peacetime and unquestionably will help in reducing smoke pollution of the atmosphere.

As in the case of the Fuel Research Station, all our research stations left their peacetime problems largely in abeyance during the war and worked on matters of wartime importance. These problems arose either as specially urgent matters within their own respective fields or as entirely novel problems posed in the first instance by the Defense Research Departments. Our Road Research Laboratory, for example, keeping its staff and facilities intact, turned to the study of the physics of explosions. Its staff thereby became as expert on destroying concrete as they already were on making it!

Science and Government Functions

Now in considering the applications of science we must note the changing function of government. In Graham Wallas' famous phrase government "has come to be engaged not merely in preventing wrong things from being done, but in bringing it about that the right things shall be done." In discharging this most positive function we find that, to an increasing extent, science is being used as part basis for the formulation of government policy. A very interesting problem of organization therefore arises. We desire scientific knowledge to permeate the executive departments. How far, then, can a central scientific department serve these executive departments, and in what way should its service be supplemented by scientific staff and scientific work within the executive departments themselves? (Continued on page 240)

Incentives for Research

Only in an Environment in which Private Enterprise Reaps the Natural Reward for Advances which It Produces Can Full Benefits of Research Be Derived

By ROBERT E. WILSON

THE use of the term, engineering research, varies considerably in different quarters. In some companies and industries the term is used to include practically all applied research, as distinguished from fundamental scientific research. However, in many industries, and certainly in the chemical and petroleum industries, research in the field of applied chemistry or chemical engineering is not ordinarily considered to be engineering research. As a matter of fact, most large industrial research laboratories employ, roughly, equal numbers of chemists and chemical engineers, who work closely together, and even research on a pilot plant scale to develop information necessary for the design of large-scale equipment is not ordinarily referred to as engineering research. The latter term is more generally reserved for research in mechanical, electrical, metallurgical, and other fields of engineering which might be included under the general description of applied physics.

Broadly speaking, engineering research is more likely to be concerned with the solid state than is chemical research, and this, coupled with the complexities of engineering materials and structures, tends to increase theoretical and experimental difficulties.

When we come to consider incentives, there is little difference between the incentives for engineering research and those for any other kind of applied research, except that in most of its phases engineering research is expensive and not well adapted to university laboratories. It is also a relatively neglected field in which there is more need for rapid expansion than in the chemical and related fields in which research has had such spectacular growth during the past quarter century. Too much engineering design is still largely on an empirical basis. Adequate incentives for research are therefore particularly important to insure the prompt and adequate development of engineering research.

For the past few years there has been an understandable overemphasis on the spectacular achievements of science and engineering during the war. It is not necessary to devote consideration to such accomplishments, however, because the reader is already familiar with them, and there is no need to imply that the wartime achievements of research represent its principal claim to support. What I do wish to emphasize are the peacetime values of research and how to insure our having them. I should like to illustrate my thesis with some of the results of research in the industry in which I have worked for the past quarter century.

At the end of World War I it was felt that the petroleum industry had reached its peak and was about to go into a decline. Petroleum reserves were believed to be sufficient to last only about 15 years. Gasoline sold for about \$0.30

a gallon and the elder La Follette predicted the imminence of gasoline costing \$1.00 a gallon.

Now, at the end of another tremendously oil-consuming world war, the average service station price of gasoline is only \$0.15½ per gallon (excluding taxes). Instead of using up our oil reserves in the predicted 15 years, we managed to find enough to keep us going at an accelerated rate for almost twice that long; and we have definitely proven reserves of petroleum four times as large as the total ultimate reserves estimated 28 years ago. In addition, the petroleum has been converted into far better products than were being made in 1918.

The dynamic factor which made these achievements possible has been improved technology which has resulted from research, and its application to every branch of the industry.

If this statement requires elaboration, we need but consider recent advances in methods of finding oil. In this field surface geology had about reached its capabilities by 1920. Then there came along, however, a whole group of new and highly sensitive physical instruments — the gravity meter, the magnetometer, and the seismograph — whose application changed completely the means of locating oil deposits. Operating on the surface of the earth, they permit rock formations to be mapped several miles deep in the earth, and have made possible the discovery of hundreds of new fields where there were no surface indications.

"Scientific discovery and its technical application make up a kind of self-propagating process, each new gain supplying the means or the impulse to the next one. A chain reaction may peter out because each element is too weak to excite an equal one to follow it, or because its scale is too small. Or it may grow indefinitely in speed and intensity, because its scale is sufficiently large and each element on the average is strong and quick enough to start off a greater successor. . . . Scientific discovery in the past has sometimes flared up locally and then died down again. . . . History can show many examples of regional civilizations which grew and flourished, and then somehow became unstable and disappeared. . . . There is a strong tendency in the human mind, particularly in England and America, to reflect complacently, 'Ah, yes, but those things never happen to us.' Perhaps the last few years may have taught some of us a lesson: they very nearly did happen to us."

ARCHIBALD V. HILL,
Secretary of the Royal Society

In 1918 the physical limit of drilling was about 5,000 feet. New drilling methods, better steels, and many other inventions, as well as generally better engineering, have now made it possible to drill as deep as three miles, thus trebling the volume of earth from which oil can be recovered. Novel electrical logging devices, sent down a new well, use electrical methods or gamma rays to give a clear picture of the rock formation all the way down. They permit accurate contouring of structures and keep productive sands from being overlooked, as frequently occurred in the earlier days. By gas recycling and water flooding, aided by scientifically controlled production rates under proration, it is now possible to recover 60 to 70 per cent of the oil in many producing areas, as compared with 20 to 30 per cent in the earlier days. If 60 to 70 per cent recovery appears to represent low yield, it is well to recognize that we deal with rocks with a porosity about equal to that of a cement sidewalk, and at depths one to three miles below the surface. The recovery, through a single six-inch hole, of 70 per cent of the oil which underlies 20 acres is a real engineering achievement.

In the refining field, technology has made so many contributions that they cannot be recounted here. We are no longer mere refiners, purifying the products which nature supplies; rather are we large-scale chemical manufacturers, able to produce almost any desired yield or quality of motor fuel, as well as countless other products. Nevertheless, refinery costs per barrel are much lower than when we were mere refiners. Without the quality of gasoline and oil made possible by research, automobile engines would give less than half the power which is today obtainable from a given size of engine; our airplane engines would develop about one fourth their present power.

Extensive research has also shown us how to make gasoline and other petroleum products from natural gas at about present prices, and even how to make gasoline from coal and lignite at prices only five or six cents a gallon higher than current prices. If and when our petroleum reserves should become inadequate, such knowledge, resulting from research, will be invaluable.

Beginning of Research in Oil Industry

It would have been a tragedy, both for the public and for American oil refiners, if the petroleum industry had not engaged heavily in research. This thought causes us to stop and analyze how that research came to be done. Why did our industry, which 30 years ago employed less than 40 research workers (and usually excluded them from the refinery yard), expand this activity until today it employs several thousand full-time research workers and would like to hire as many more over the next few years?

I should like to be able to tell you that the oil industry's research was due to a broad, public-spirited interest in the welfare of our country. Frankness, however, compels me to let you in on a little secret, which brings me right to the heart of my subject. The real reason why our industry has spent hundreds of millions of dollars in research and development during the past quarter century is that we thought we could make a profit by so doing!

Although eventually we might have been smart enough to figure out for ourselves that research is profitable, our thinking was helped out by one fortunate event, if we can thus properly label the work of a pioneer.

About 1912 Dr. William M. Burton and his associates in the laboratory of the Standard Oil Company of Indiana invented the Burton process for cracking cheap heavy distillates to make gasoline. He showed not only how to control the conversion of large hydrocarbon molecules into smaller and more valuable molecules, but also how to do it at a considerable profit.

For some years the industry had been wondering how to meet the rapidly growing demand for gasoline with the limited quantity naturally occurring in crude oil. Dr. Burton's invention, which was widely licensed to other refiners, solved the problem. It conserved the country's petroleum supplies, it gave the customers better gasoline at a lower price, and it made millions of dollars for Dr. Burton's company. As an important by-product, it sold the petroleum industry on research. It pointed out, not only to technologists but also to management, that inventions have great cash value, and that to lag behind in technical developments was likely to be costly. The more progressive refining companies rapidly expanded their research, and this activity constantly grew as it proved its value in every branch of our industry.

The quarter century following 1918 saw more than a thirty-fold increase in the number of research workers in our industry. Today one independent petroleum research company, which spends two or three million dollars a year in its laboratories, is financed entirely by royalties on processes which it has developed and which it licenses mainly to the smaller refineries. While the larger oil companies are also quite willing to license their patents, royalty income is today a very small factor in the encouragement or financing of their research programs. In the highly competitive petroleum industry the oil companies are primarily interested in the direct effects of research on their own operations and in having something to trade with others, so as to be able to use the best process or combination of processes which anyone may develop.

Yes, the hope for profit, either as royalties or as earnings from operations is what has justified expenditures in the field of research. Those who are critical of the fact that several million dollars for patent royalties are annually collected or paid (and often one company is on the receiving end in one technical field, and on the paying end in another) may be reminded that the total scientific research and development expense of the oil industry is today around \$40,000,000 per year, which is more than five times the current royalty payments. Furthermore, the saving to the American people in having gasoline at an average price (excluding tax) of \$.015½, instead of the 1920 price of \$.029¾, has been around \$4,200,000,000 in a peacetime year! Of course, not all these savings should be credited to research, but on the other hand, this figure does not include the tremendous additional savings due to better quality, nor the more important fact that, without the doubling of gasoline yield due to research, the prediction of a dollar per gallon for gasoline might well have come true.

Detriments to Future of Research

So much for the past. But what of the future of research? With such a past record you may wonder why further incentives for research are needed. The fact is, however, that in spite of this history of achievement, there are some serious clouds on the horizon which threaten the ability of research to continue its vital con-

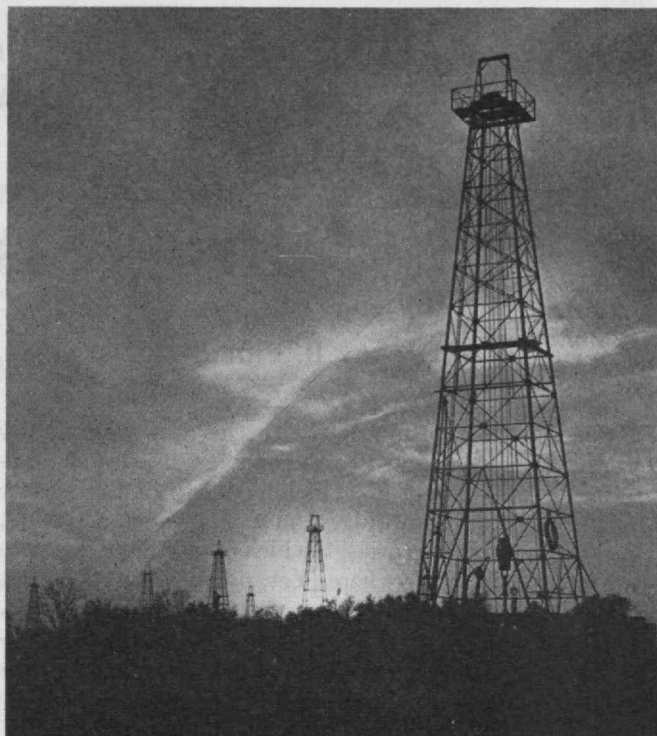
tribution to the life of our nation. One such cloud is the fact that the simpler and easier problems have been solved. We are left with the more difficult ones. When I entered the petroleum industry in 1922 I was the second chemical engineer to be employed by my company, although it had about 25 chemists. All around the refinery were inviting problems which could be solved by a few weeks or months of intelligent application of engineering principles and which would save hundreds of thousands of dollars a year. Today every operation has undergone repeated scrutiny from chemists, engineers, and other scientists. It requires extensive study to make any major improvements. Also, in a highly research-minded industry the new improvements become obsolete much more rapidly than was once the case.

For these reasons the law of diminishing returns is beginning to apply to many fields of research. During the past quarter century our industry has passed through an evolution similar to that which occurred in the field of geographical exploration during the last century and a half. Daniel Boone with a rifle and a pack horse could add tremendously to public knowledge of new territory. Today it takes a Byrd expedition, a large, expensive, and well-organized group with much scientific equipment, to make any significant additions. In one respect, however, the analogy fails. Our geographical frontiers are necessarily shrinking as exploration proceeds. The frontiers of science, although becoming more difficult and expensive to penetrate, are ever expanding. Engineering research in particular offers many new and promising frontiers.

The Need for Trained Man Power

A second obstacle to research is the serious shortage of technical men which faces us, particularly during the next five years. As industrial operations become more complex, technically trained men are needed as operators or supervisors, and such jobs generally have priority over research. It will be impossible for our educational institutions to meet the demand for technical men during the next several years. This shortage stems back largely to the shortsighted policy pursued by the military authorities in drafting thousands of technical men for nontechnical jobs, and particularly in uprooting almost completely the young students who were part way through our technical schools. It seems strange that the nation which has profited most by the development of science and engineering was least enlightened in the utilization of technical and prospective technical men during the war. I have yet to find the individual within or without the military service who did not give at least lip service to the theory that technical men should be employed at scientific work, but the facts are that many thousands of technically trained men were put in the Army to do entirely nontechnical jobs, and that many promising young students were prevented from completing their technical education.

The third difficulty in expanding our research program is the accumulated deficiency in basic research. As was well pointed out in the very fine report made to the President by Dr. Vannevar Bush, '16, and his committee, we were too dependent before the war on European sources for much of our basic research. During the war we made tremendous advances in applying known principles of science, but we discovered very little that was basically



H. Armstrong Roberts

new or fundamental. This is one field where we have been drawing upon our reserves at an alarming rate.

A fourth threat to the future of research arises out of the attempt of a relatively small group to wreck our patent system. They have misrepresented the basic facts about patents and have filled the papers with discussions of a few unusual and nontypical, patent-control schemes, with which our antitrust laws are quite adequate to deal. They have even raised the old, worn-out specter of so-called suppressed patents. Both our previous and our present patent commissioners state they have been unable to discover any patents which have been suppressed. Facts and logic, however, seem of very little interest to detractors of the patent system.

Even emasculation of our patent system, however, would not today cause marked curtailment of the research programs of most large companies because they now realize that the main value of research to them lies in making new and better products, developing new processes, reducing operating costs, and so on. There would, however, be several very serious results of a substantial weakening of our patent system.

First of all, the smaller operating companies, independent inventors, and research and licensing companies would have little incentive to continue research. To them, income from the sale or licensing of patents is the only way in which they can reasonably expect to recover the extremely high cost of modern research. We would lose the diversity of approach and the independent viewpoint which have been of outstanding value to all industry. We must not overlook the fact that the telephone was invented by a teacher of the deaf, the telegraph by a professor of physics, celluloid, the first plastic, by a printer, and the Diesel engine by another professor.

The second unfortunate effect of emasculation of our patent system would be reversion to the dark ages of secret processes. Fundamentally the grant of a patent is not to reward a discovery, but to compensate an inventor for prompt and full disclosure (*Continued on page 232*)

Diversity and Progress

BY HENRY B. PHILLIPS

IN comparing the present with the past we find few things have changed so radically as the idea of progress. As a result of a lifelong study of the matter J. B. Bury¹ of Cambridge University concluded that, until the last two centuries, the idea of unlimited advance had never existed anywhere. Yet, now, expectation that the future will surpass the present is almost universal. This is significant for it may imply recognition that perpetual progress is now possible for the first time. Thus it is interesting to consider what are the conditions favorable to progress and whether any of these exist to an extent that has not occurred before.

Consider first some of the characteristics of progress, assuming that, over the long periods with which we are concerned, progress is measured by the creation rather than the distribution of resources.

Progress results from the efforts of all the people. Thus it is a group accomplishment but one of a rather peculiar nature. In the usual activities of everyday life, the total accomplishment of a group of workers is the sum of the things done by its members. We are accustomed to accept this additivity of effects as a universal principle. For the advances which constitute progress it is not valid however. If a group of men engage in research and 10 of them make the same discovery, not 10 discoveries are made but only one. For work of this kind the total accomplishment of the group is not the sum of the things done by the individuals but the sum of the different things. The total accomplishment of the group, therefore, is greatest when the activities of its members exhibit greatest diversity.

The same conclusion follows when we consider that progress involves a continual advance into the unknown. At each step of such advance, features are encountered which are not logically dependent on anything previously known, and which consequently cannot be foreseen by any intelligence however great. The results are thus subject to chance and the total influence of chance increases as the interval under consideration is lengthened. Since the probability of success in any game of chance increases with the number of trials, it follows that progress is most rapid when the trials made have greatest diversity.

Thus, whether we consider progress as group accomplishment, or advance into the unknown, diversity is indicated as the optimum condition.

Failure to provide this diversity is a major defect in all schemes of central control. In any such scheme a single decision must be reached, and because of the influence of chance, any single decision relative to the future is probably wrong. This difficulty is just as serious in

democracies as in other forms of government. As the term is now used, the central feature of democracy is majority rule. Unfortunately, there is only one majority. In matters where chance plays a predominant role, this means the majority is doomed to be nearly always wrong.

To this one might object that, despite its defects, majority rule is better than minority rule. That is undoubtedly true but it is not necessary to have either. In addition to majority rule and minority rule there are many other kinds of rule. In particular, there is the case of no rule at all, under which form greatest progress has been made.

Suppose, for example, you have the misfortune to have appendicitis. If you choose a good surgeon your chances of survival are almost 100 per cent. When I was a boy, however, I knew a number of people who had appendicitis, every one of whom died. What is responsible for this change from almost certain death to almost certain survival? No law on the subject has been passed by Congress or any of the state legislatures. Even the medical societies have probably done very little. Individual doctors and hospitals have merely improved their methods and others have followed the methods found to work best. Thus, under no rule at all, it has come to pass that people with appendicitis no longer have to die. Similarly in all lines, progress is most rapid when there is least rule because this is the condition under which the actions of people have maximum diversity.

Failure to provide this diversity is a defect not only in real states but in all the utopias created by human imagination. The authors of these imaginary states give to their creations such limited and static structures that if their utopias were established and left without interference it is doubtful if they could even survive. And certainly in a little while, through lack of progress, the inhabitants of these ideal states would merely work harder, have less, and die earlier than people in the rest of the world.

In some of these utopias neglect of diversity appears even to be deliberate. Thus, Plato in his *Republic* inquires what quality is most desirable for the citizens of his ideal state to have, and concludes that this quality is unity. It is not entirely clear what Plato meant by unity, but Aristotle, who knew Plato better than we ever can, seems to infer that Plato meant the citizens should be essentially alike. For in his great essay on politics, Aristotle quotes this theory and criticizes it. He says there can be too much unity, that a state does not consist of many people but of many kinds of people.

Cycles of Civilization

Of the many kinds of people the most important are those of superior ability, and the development of these is the greatest step in human progress. In historic times human ability has been subject to wide periodic variations. A most interesting study of these variations was made by W. M. F. Petrie,² the eminent English Egyptologist. Petrie divides the last 7,000 years of Mediterranean history into eight periods. Each period begins with an invasion by a foreign race. This is followed by an interval of gestation usually lasting from six to eight centuries. Then there is rapid development reaching its peak first in sculpture, and then, successively, in painting, language, mechanics, and finally in wealth. After a brief period of luxury, decay sets in and this (Continued on page 226)

¹ J. B. Bury, *The Idea of Progress*. (New York: Macmillan Company, 1920.)

² W. M. F. Petrie, *The Revolutions of Civilizations*. (New York: Harper and Brothers, 1922.)

Humanities in an Engineering School

The Teaching of Liberal Arts May Benefit as Much from Plato's Method of Dialogues as from Application of the Scientific Method

BY RICHARD A. NOVAK

WITH increasing frequency, graduates of scientific schools are being called upon to pass judgment upon matters not strictly amenable to mathematical treatment and not easily subjectable to controlled laboratory conditions. More frequently they are being asked questions involving human relations, philosophy, economics, sociology, and especially politics. It is a natural presumption of the layman that one who is skillful and intelligent enough to deal successfully with the complex problems of science is one whose voice should be heeded in other matters.

It is unfortunately true, however, that rare is the scientist or engineer who can honestly claim to know more about the nonscientific problems confronting the world today than the average intelligent layman. At a time when his prestige is high, and the need for an authoritative voice is great, he must either admit his ignorance or pretend knowledge. If he does the former, the world is left in the hands of the men who put it where it now is. If he pretends a knowledge which he does not have, and trades upon the name of scientist, he places himself in the same category as the primitive practitioner of black magic who danced about his patient in weird headdress.

There is nothing new, of course, in the suggestion that the way out of this dilemma should lie in the right application of scientific methodology. In the terminology to be used here, the words "liberal arts" could be substituted for "scientific methodology." For the present purposes, the liberal arts will be defined as those arts having to do with the proper and skillful manipulation of symbols. The methods of science are one example of this proper and skillful use. It is perhaps not too much to say that the physical sciences are pre-eminent today only because those who pursue them have been consciously, almost painfully, aware of themselves as manipulators of symbols.

Approach to Instruction in the Humanities

The thesis of this paper is that in its instruction in the humanities the scientific or engineering school would do well to make equally explicit the manipulation of symbols in nonscientific subjects. The interplay made possible by a comparison of the use of symbols in scientific and nonscientific fields should make this task easier.

To make clear what is being suggested, it would perhaps be best to adduce a simple example. Let a geometrical system of some sort be assumed. It can be described by a number of postulates and definitions and by the theorems which arise logically from them. Such a system, taken by itself and without reference to actuality, has what can be called a truth-value which is a function of its internal consistency. There is, in other words, a very

real sense in which the geometry can be called true or false, even though it may have no relevance whatsoever to actuality. Let this type of truth or falsity be called the primary truth-value of the system.

If our geometrical system is applied to the measurement and description of some segment of actuality — for instance, a chair — and it is seen to describe the geometrical characteristics of the chair adequately, it may be said to be true in a different way from that described as primary truth. Let this type of truth or falsity be called the secondary truth-value of the system.

It may be well to point out here that the system is said to be representative of actuality, that is, to have a high secondary truth-value, when it adequately describes the measurements taken of actuality. The consideration of importance here is that, strictly speaking, a high secondary truth-value implies a high degree of correlation between system and measurements. It is unjustifiable to equate measurements of actuality with actuality.

The process of measurement really requires that actuality be treated as though it were itself a symbol. We impute to some segment of actuality a meaning, dictated by the system and by the limitations of instruments available, in much the same manner that we assume a word has meaning. Instead of having recourse to a dictionary to evaluate this meaning, however, we apply some unit-measuring stick, the instrument, and then define actuality in terms of the measuring stick. It has often been pointed out that measurement is a metaphorical process, differing little from the use of metaphors by the poet or philosopher. To say that a table is five feet long is to say that there is a relation between the unit-foot length and the table length which is the same as a relation between one and five. William E. Johnson in *Logic** has shown that more commonplace metaphors have the same form. Thus, when an Australian speaks of England as the mother country, he is really saying that there is a relation between England and Australia which is the same as the relation between mother and child. The formal similarity between the two cases is easily apparent.

There is nothing new or startling in what has been said above. If it achieves any mark of distinction at all, it probably can be said to arise from an oversimplification and, possibly as a consequence, distortion of a complex process. Since, however, our purpose is simplification, this may not be entirely bad.

Primary and Secondary Truth-Values

Having stated in outline form the structure of a geometrical system and having indicated the criteria for

* *Logic* by William E. Johnson. (New York City: The Macmillan Company. Part I, \$6.25; Part II, \$4.50; Part III, \$4.25.)

statements of truth or falsity of that system, let us turn our attention to something nonscientific.

Let us assume there are two opponents who are having a political argument. It will not require too much imagination to put the opponents into violent opposition. Not infrequently such arguments



Photo by Fred G. Korth

The methods of science are one example of the proper . . . and . . . skillful manipulation of different sets of symbols.

end in blows; between nations they may be a contributing factor to wars.

Without specifying the particular issue of the argument, it is proposed to take our geometrical system as a formal analogue and attempt to determine at what points either opponent may be judged right or wrong. Assume that opponent *A* has made a statement; it can be any statement. We may consider this statement as a theorem in some system analogous to the geometrical system. Inasmuch as it is a theorem, it presupposes some postulates and some definitions.

We can investigate *A*'s statement solely in the light of the postulates and definitions upon which it is based. If it is logically consistent, we may say that it has primary truth and to that extent may be right. We may, however, find that *A* is not aware of the axioms which generate his statement. If, by judicious questions, we are able to bring them to his attention, he may confirm or repudiate them. Note should be taken that there is little difference between such critical investigation of postulates by persistent questioning and what the psychoanalyst tries to do in his treatment of an unbalanced person.

Implicit in the above statement is the assumption that human beings are not, in general, illogical. Usually, what is called an unreasonable or illogical opinion is one the axiomatic grounds of which are unclarified. Sometimes it is more convenient for a man to be called unreasonable than it is for him to reveal, to himself or to others, the postulates which would justify his logic.

The point of importance here, however, is that an opinion can be considered as a theorem of a system which

may be investigated for its systematic or primary truth-value without any consideration being given to its secondary truth-value. Such an investigation imposes upon the investigator a disciplined approach to the uses and misuses of symbols. Its ultimate value lies in the cleansing effect which the revealing of postulates will have.

Once a statement has been investigated in its systematic context, it is possible to subject it to similar scrutiny to determine its secondary truth-value. The units of measurement should arise naturally from, and be consistent with, the postulates and definitions of the system. In effect, the units of measurement will impose their meaning upon actuality as questions, and actuality will answer with a "yes" or "no." It remains only to decide whether the questions are trivial or significant.

The suggestion is not being made here that arguments, especially political ones, are very often carried through to completion along the above lines, nor is it even being suggested that they should. It is believed to be important, however, that parties to a discussion understand to what they are party. To hold opinions on a political, or any other issue, is to take upon oneself the intellectual responsibility to discover and evaluate one's axioms. Only when this has been done can any rational estimate be made of the opinion. Only when this has been done is one justified in convictions firmly held, for then only are they held with a knowledge of what they involve and imply.

The Humanities in Engineering Schools

It would be well to return now to the original problem and discuss what bearing all this may have on the teach-

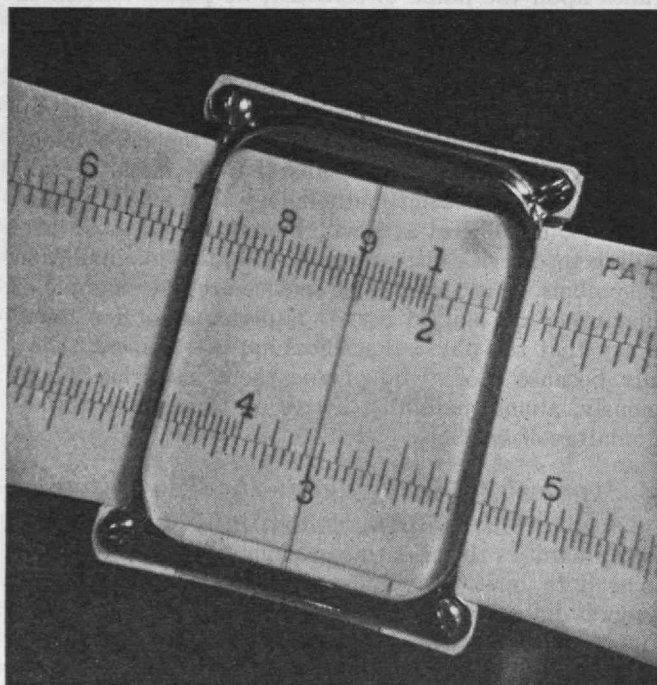


Photo by David Brooks, Loomis Institute

ing of the humanities in an engineering school. It is being maintained here that what any course in the humanities should teach is not politics, not philosophy, not economics, but rather the liberal arts. It is to be remembered that the liberal arts were defined above as the arts having to do with the proper and skillful use of symbols. (Concluded on page 230)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Institute Finances

IN presenting the Treasurer's report on M.I.T. finances for the fiscal year 1946 a gradual tapering off, rather than the expected sharp decline, in the volume of transactions for the year following the end of the war is reported by Horace S. Ford. Total volume for the 1946 fiscal year was \$30,000,000; two-thirds that of the previous year, but more than that for 1944. Endowment and other funds showed a total book value of \$46,000,000 compared with \$43,000,000 for the previous year.

Largely because of the increased number of returning students, the educational and administrative operations totalled \$4,000,000 as against \$3,470,000 for the year 1945. Expenses exceeded income by \$109,000 and the all-time cumulative operating deficit, at the time of the report, stood at \$7,100.

Two items on the asset side of the balance sheet should be especially noted. Advances for current operations, \$3,700,000, are \$250,000 more than for the previous year, occasioned largely by long delayed payments of student tuition fees of veterans, sponsored by the Veterans' Administration along with other government contracts. The \$4,000,000 of accounts receivable is almost \$1,000,000 less than for the previous year.

For the year past, new loans from the Technology Loan Fund were but \$16,000 against repayments of \$122,000 which brings the total of notes outstanding against student borrowers to \$422,000 out of the \$1,800,000 total of the Fund. Repayment to maturities of more than 98 per cent is being maintained.

From the financial point of view, the student housing project at Westgate needs at least 15 years of continued occupancy to be reasonably well amortized. Income on this \$500,000 commitment is not likely to exceed two per cent. Building 22 of the Radiation Laboratory has been purchased for student occupancy and its reconversion to barracks-type housing has cost \$153,000 including equipment, which is not likely to be recovered.

The third or F.P.H.A. housing project, in which families are now moving, consists of the two-story Navy barracks which have been erected immediately west of Westgate and is known as Westgate West. The initial cost of providing the site, grading, filling, and bringing in the services supplied to these buildings will require an expenditure of Institute funds of approximately \$130,000. The government allows a return of \$15.00 per family per year of occupancy. If this project should last for five years and be completely rented to 180 families during this time, the return would be but \$13,500, leaving an anticipated deficit of \$110,000 to \$115,000, not including the cost of demolishing the buildings.

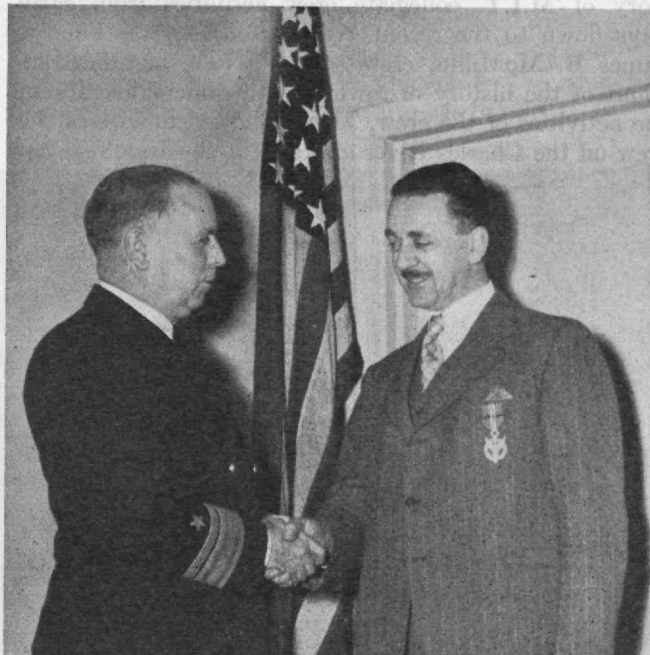
The three emergency housing projects which the Institute now operates may, therefore, be expected to represent a loss of between \$250,000 and \$275,000, a rather substantial contribution from the Institute to the pressing housing shortage of the community.

Of Past and Future

WITH an attendance of 99 members and guests, the 253d dinner meeting of the Alumni Council was held in Pritchett Hall of Walker Memorial on November 25, 1946. Harold Bugbee, '20, President, called the meeting to order at 7:05 P.M. and introduced Professor George Owen, '94, newly elected Council representative for the Class of 1894. Professor Avery A. Ashdown, '24, introduced his guests, Robert J. Hansen and Edward Cole, graduate students at the Institute.

In presenting his report, Alumni Secretary Charles E. Locke, '96, announced that a midwinter meeting of the Alumni of Metropolitan Boston has been scheduled to be held on the evening of February 8 in Walker Memorial. President Karl T. Compton will introduce Dr. Everett M. Baker, Dean of Students. Dr. Vladimir K. Zworykin, Associate Director, RCA Laboratories, will explain and demonstrate the operation of a complete television system in a program lasting an hour and a half.

Saturday, June 14, 1947, has been selected for Alumni Day when M.I.T. Alumni will return to Boston to renew old acquaintance and attend the Stein-on-the-Table Banquet. The Executive Committee nominated the following committee chairmen who were elected by the Alumni Council: *Banquet*, William W. Garth, Jr., '36; *Exhibits*, Herbert L. Beckwith, '26; *Ladies' Program*,



Official Navy Photo

For his service as wartime director of the Anti-Submarine Warfare Research Group in the Atlantic, Professor Philip M. Morse was recently awarded the Medal of Merit by Rear Admiral Monroe Kelly, U.S.N., Commandant of the Third Naval District. Professor Morse, well known to Review readers as one of its editorial associates, is on leave of absence to serve as director of the Brookhaven National Laboratory, devoted to pure research in atomic sciences.

Mrs. William H. McAdams; *Luncheon*, John B. Wilbur, '26; *Publicity*, Ralph T. Jope, '28; *Registration*, Wolcott A. Hokanson, staff; *Symposium*, Donald Whiston, '32; *Transportation and Hotel Accommodations*, Emmons J. Whitcomb, '11; *Ways and Means*, Delbert L. Rhind, staff. Parke D. Appel, '22, Alumni Day Chairman for 1947, presented plans for observance on June 14, announced "Advances in the Air" as the theme for the forenoon symposium, and reported that the Hotel Statler would be the scene of the annual banquet.

In the absence of George Warren Smith, '26, chairman of the special committee on the Boston Luncheon Club, the Alumni Secretary reported that daily luncheon meetings were being held from 12:00 to 1:30 P.M. at Thompson's Spa on Washington Street in Boston. Council members were urged to attend these meetings when possible.

H. B. Richmond, '14, presented the report of the Committee on Resolutions for the late Henry D. Jackson, '95.

At 8:00 P.M. the Council had the good fortune to listen to a 10-minute inaugural address by President Karl T. Compton, which opened the Beaver Network. As recorded on page 166 of the January, 1947, issue of *The Review*, this activity provides a student-operated, carrier-current broadcast system for dormitory residents.

Vice-president James R. Killian, Jr., '26, gave an account of his recent visit to nine local clubs throughout the country. With the return to more nearly normal peacetime conditions, Dr. Killian found clear evidence of renewed interest in local clubs. He found alumni interest high in the M.I.T. program of humanities and in extra-curricular activities.

John W. Leonard, Jr., '47, coxswain of the M.I.T. crew, spoke briefly on crew activities, and especially the trip to the regatta in the State of Washington last June. He was followed by Ralph T. Jope, '28, who gave the story of M.I.T. collegiate crew activities from early days down to the recent Washington regatta. Finally, James B. McMillin, crew coach, gave a historical account of the history of rowing, with some sidelights on the activities of the crew. There followed movies of the crew on the Charles River and also at the June regatta.

Hope for the Dinghy Fleet

A NEW experimental dinghy for the M.I.T. Nautical Association was recently christened at the Sailing Pavilion when Miss Hope Wiswall named the new boat *Hope* as she broke a bottle of Narragansett Bay water over the bow of the little craft. Miss Wiswall, a Radcliffe student, is the niece of Paul M. Wiswall, '09, donor of the new dinghy.

The new boat is a trial model, designed by George Owen, '94, retired Professor of Naval Architecture, who drew up the original plans for the present Technology fleet. The present fleet is beginning to show its age after 10 years of almost constant use, and a new fleet is indicated sometime in the next few years. The new model is similar to the original boats in dimensions and lines, except that a canoe stern replaces the transom type, and the boats have been given more stability amidships. The canoe-type stern gives greater rigidity of construction, particularly should molded plywood or one of the new plastic processes be used in the construction of the new fleet. The *Hope* has proved very satisfactory in trials.

Sailing at Technology has proved increasingly popular since it was introduced in the spring of 1936. The membership of the Nautical Association reached a new high this past year with 1,057 members representing approximately one-fifth of the Institute population. In addition to an increased intramural program, the sailing team captured all three major dinghy championships, the McMillan Trophy (large yachts), the Morss Bowl (dinghies), and the Star Class Intercollegiate Trophy. In addition, Roger Willcox, '42, won the National 110-championship in the Morss, one of the Technology fleet. M.I.T. sailors captured 19 first places and four of the second places in the total of 23 regattas during the past year. Technology skippers, Charles M. Hunt, Jr., '47, Daniel W. Greenbaum, '47, John Marvin, '49, Leigh A. Brite, '46, and Alfred A. LaFountain, '47, were the first five men in the traditional 10 best skippers selected from the 33 colleges which now form the Intercollegiate Yacht Racing Association.



Miss Hope Wiswall christens the new experimental dinghy *Hope* as Commodore Stephen B. King, '47, and Professor Erwin H. Schell, '12, look on. Instead of the traditional champagne, water from the Narragansett Bay was broken over the bow in reminiscence of the region where Paul M. Wiswall, '09, donor of the dinghy, first learned to sail. The new boat was designed by Professor George Owen, '94, who also designed the M.I.T. dinghy fleet which has been in constant use during the last decade.

Economics and Engineering

THE Visiting Committee on the Department of Economics and Social Science* met on March 15, 1946, at the Racquet and Tennis Club in New York. George A. Sloan, the chairman, entertained the group at lunch, after which discussion centered upon a new undergraduate course in Economics and Engineering. As explained by the representatives of the staff present at the meeting, such a course would be designed for those planning to become staff executives in the economic, personnel, statistical, or other departments of a business, governmental, or labor organization. It will also serve those who will go on to graduate work in economics in preparation for teaching. In the past, such persons have come into their profession from the liberal arts colleges. The Institute's new course offers the engineering approach. The student will be equipped to use the methodology of exact science in the analysis of economic problems. Being grounded in engineering, he will be prepared to evaluate the impact of technology upon our economic life. The country needs economists with an engineering background.

The subjects in Economics and Engineering have been selected with a view to achieving three main objectives: to impart some knowledge of human behavior; to show how industry is organized and operated; and to give some conception of the broader aspects of economic, political, and social problems. Students have the choice of two options: Human Relations and Industrial Economics.

The Human Relations option emphasizes the first of these objectives. It is planned to help the student to be effective in his relations with superiors, associates, and subordinates. It therefore includes such subjects as advanced psychology, labor relations, the management of people. The Industrial Economics option emphasizes

* Members of the Committee for 1945-1946 were: George A. Sloan, Chairman, Franklin W. Hobbs, '89, William J. Barrett, '16, Raymond H. Blanchard, '17, Edward P. Brooks, '17, Oscar S. Cox, '27, and Carlton Richmond. Also attending were: James R. Killian, Jr., '26, Vice-president, Robert G. Caldwell, Dean of Humanities, Douglass V. Brown, and Ralph E. Freeman of the Department.

the second of the above objectives—to provide an understanding of economic institutions and industrial organizations. It includes such subjects as industrial economics, finance, analysis of price and production. In both options professional electives afford an opportunity to pursue further study in related fields.

Although the course is set up especially for those with tastes and aptitudes for economic analysis and its application in industry and government, the engineering content is substantial. The dual character of the program is evident from the fact that, while it meets the educational requirements for "junior economist" under existing civil service regulations, at the same time, it is adequate to qualify graduates as certified engineers. In the third and fourth years a student may choose one of three groups of subjects selected from the offerings of the Mechanical, Chemical, and Electrical Engineering Departments.

There was some discussion of the provision making students choose one of these three groups of subjects rather than permitting them to select subjects from several different branches of engineering. The Committee came to the conclusion that the group system is preferable. It insures that the engineering study will be carried beyond the beginning stage, thus making the program more interesting and of greater educational value than if students elect a scattering of elementary subjects. As to the nonengineering content, the Committee questioned the omission of accounting. Although it was pointed out that accounting could be chosen as an elective, there was a strong feeling that students in both options should be required to take this subject. Statistics and production were also mentioned as basic requirements.

Several members emphasized the desirability of carefully selecting the students to be admitted to the course.

The plan as a whole was unanimously approved. There was no feeling that by going into economic education M.I.T. was stepping outside its traditional role as a scientific and engineering institution. In fact, this new course was regarded as a valuable addition to the educational opportunities which the Institute has to offer.

On December 2, 1946, Secretary of War, Robert P. Patterson, awarded the Medal for Merit to Professor Julius A. Stratton, '23, in recognition of his outstanding service in initiating, and successfully administering, wartime programs for the development and effective tactical use of radar and related scientific devices. Dr. Stratton, who was expert consultant, Office of the Secretary of War, during the war has become director of the Institute's Electronics Research Laboratory.



Photo by U. S. Army Signal Corps

DIVERSITY AND PROGRESS

(Continued from page 220)

decay continues until the old race becomes "too weak to imitate anything when a fresh race comes in, and utilizes the old stock to graft on both in blood and culture. As soon as the mixture is well started it grows on the old soil, and produces a new wave of civilization."³

This is the pattern repeated during each cycle of Mediterranean civilization. Since sculpture, painting, and other developments came about in the same order in each cycle it was possible, by study of these, to determine the phase of civilization reached at each instant. In some cases, larger sections of a people migrated to distant lands and remained long out of contact with the home country. In such cases Petrie found that the civilization of these migrant people remained in phase with that of the home country and did not acquire the phase of the new. From this he concluded that the phase of civilization at each instant is in the blood of the people and is not influenced by environment.

In explanation of these facts Petrie suggested that each cycle of civilization was due to the mixing of two races. When two races occupy the same country and there is free intermarriage, there comes a time when every possible combination of ancestry has been made, when each individual in the population is, in most cases, not only descended from both races but is a descendant of each one of the original settlers. Petrie calls this condition complete mixing. Assuming that the population never exceeds that of large modern countries, the number of generations required for complete mixing depends on the initial population. Petrie made rough calculations but exact analysis shows that, if the initial population is not more than 1,000,000, complete mixing occurs in 24 generations. If the initial population is 10,000,000, this condition will be established in 27 generations, and even with an initial population of 100,000,000 complete mixing is accomplished in about 31 generations. Assuming the generations to average 30 years, seven to ten centuries of mixture of two races thus "ensures that, in any ordinary sized country, the full maximum number of different ancestors are blended and every strain of one race is crossed with every strain of the other."⁴ This is the period of greatest biological diversity and Petrie's analysis shows it initiates the period of greatest ability.

When any group of living things is long subjected to a fixed environment, forms unsuited to that environment are gradually eliminated, and finally there remain only those better fitted to survive. This screening process is called natural selection. Since this process consists merely in the elimination of forms unsuited to the particular environment, the surviving forms are left more and more alike and so less and less capable of adaptation to a different environment. Thus species long subjected to fixed conditions lose capacity to change, and when conditions do change may be unable to survive.

In the human species this reduction to common type is greatly aided by social influences. In childhood play, in school, and in all the activities of life, those who think and act in the conventional way find life easier and, in the end, leave more progeny to continue the normal trend.

In a settled community the diversity due to racial mixing ultimately reaches its peak, whereas the leveling in-

fluence of environment never ceases. The latter influence thus ultimately dominates, diversity diminishes, and progress comes to an end.

Now, when progress ceases, civilization does not stand still, but, as Henry George so strongly emphasized, always turns back.⁵ The reason for this is that the major part of the things which distinguish a high from a low state of civilization results from the efforts of a small portion of the people, and in the leveling process these are the people most severely reduced. At the present time, for example, only a small percentage of the people are able to design and build electric power equipment. In a reduction to common type most of these would be eliminated. With the disappearance of electric power our standard of living would drop to a level that would appear only a little better than that of ancient Greece and Rome.

But however long this leveling process continues, it never becomes complete. The nation continues to have able men, the number per million of population merely declining. Just as in a cold gas there are particles with as great velocities as in a hot gas, so in a backward people it is not the maximum ability that is low but the nature of the distribution that is changed. Under the leveling influence of custom and environment, there is a shifting away from genius toward mediocrity.

Ahead Lies Wealth — and Decline

In Petrie's diagram the period which began with the fall of Rome is still continuing. For this period we have passed the peak in sculpture, painting, and language, and are in the great era of mechanics which has now broadened out to be science. Ahead lies only the phase of maximum wealth, and, if the pattern of the last 7,000 years still persists, beyond that is the great decline. But may not conditions have changed so radically as to make that pattern forever obsolete?

In the matter of racial mixing, conditions certainly have completely changed. In former times there was very little travel. In settled countries nearly all the people spent their lives within a few miles of their places of birth, and their descendants remained in the same neighborhood for centuries. Impelled by lack of food, or desire of conquest, hordes of people occasionally moved into neighboring countries and these invasions sometimes started new periods of civilization. Now invasion has been replaced by immigration, and this process is continuous. A new period of civilization is thus starting all the time.

Consider the United States, for example. Our present culture has been transplanted mainly from western Europe and belongs to a late phase of the period which dates from the fall of Rome. Our population is, however, a complex one containing large elements from all the important countries of the world. Few of these people have been in the United States for 10 generations and most of them for less than five. Thus, mixing is not the thousandth part complete and will not become complete for four or five centuries. When the civilization based upon this mixture begins to flower, the old civilization transplanted from Europe will not yet have reached its end. In the meantime, during each century, there will have come into the United States greater multitudes than those which in the Fifth Century swept down over Rome.

(Concluded on page 228)

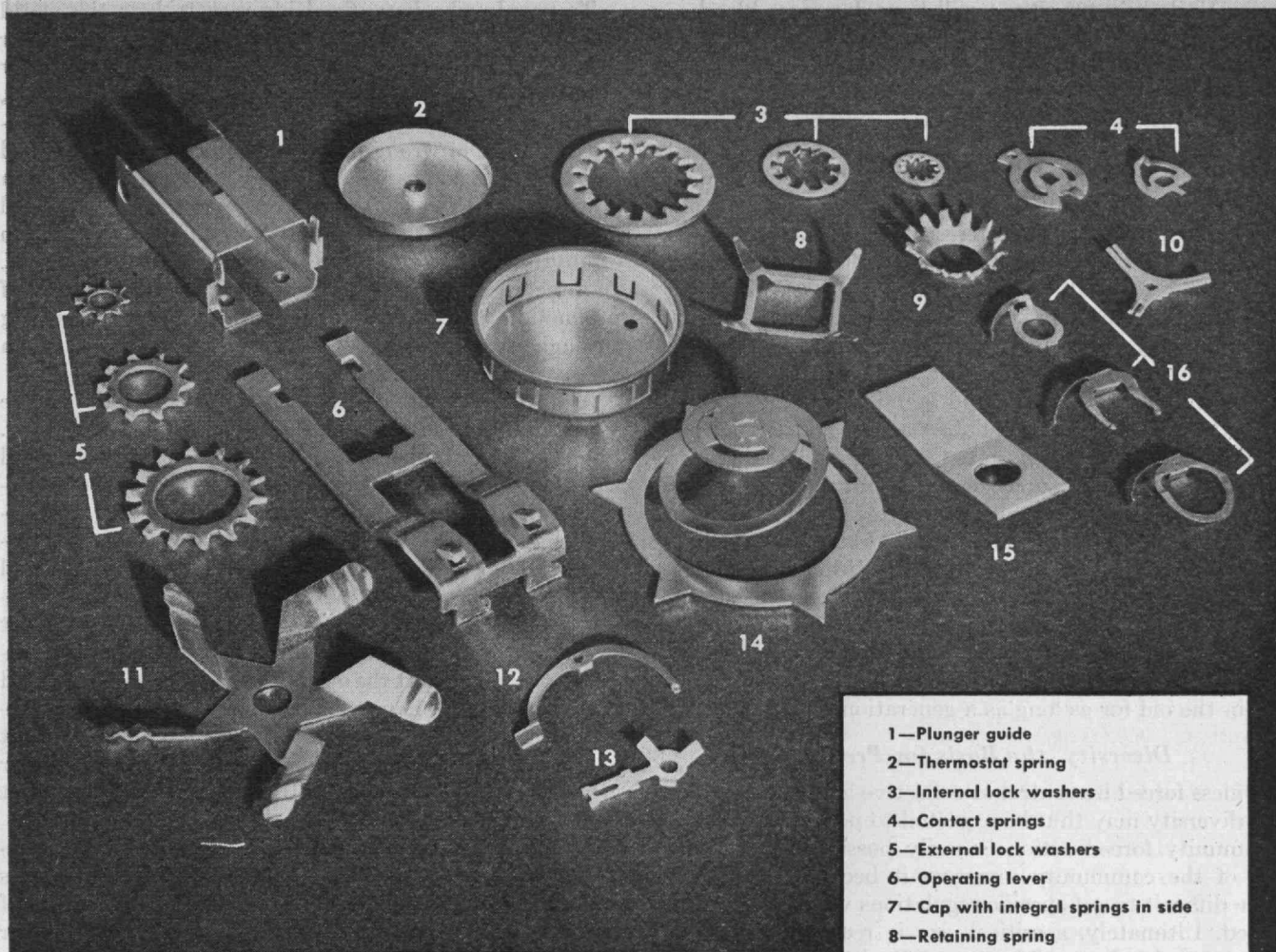
³ *Loc. cit.*, p. 114.

⁴ *Loc. cit.*, p. 129.

⁵ Henry George, *Progress and Poverty*, Book X, Chap 7. (New York: Doubleday, Page and Company, 1915.)

REVERE PHOSPHOR BRONZES

OFFER MANY ADVANTAGES



- 1—Plunger guide
- 2—Thermostat spring
- 3—Internal lock washers
- 4—Contact springs
- 5—External lock washers
- 6—Operating lever
- 7—Cap with integral springs in side
- 8—Retaining spring
- 9—Countersunk external lock washer
- 10—Pressure spring for capacitor
- 11—Five-contact spring
- 12—Contact spring for radio part
- 13—Pressure spring and terminal
- 14—Involute spring
- 15—Contact point for solenoid
- 16—Contact springs
—made of Phosphor Bronze strip supplied by Revere

STRENGTH — Resilience — Fatigue Resistance — Corrosion Resistance—Low Coefficient of Friction—Easy Workability—are outstanding advantages of Revere Phosphor Bronzes, now available in several different alloys.

In many cases it is the ability of Phosphor Bronze to resist repeated reversals of stress that is its most valuable property. Hence its wide employment for springs, diaphragms, bellows and similar parts. In addition, its corrosion resistance in combination with high tensile properties render it invaluable in chemical, sewage disposal, refrigeration, mining, electrical and similar applications. In the form of welding rod, Phosphor Bronze has many advantages in the welding of copper, brass, steel, iron and the repair of worn or broken machine parts. Revere suggests you investigate the advantages of Revere Phosphor Bronzes in your plant or product.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York
Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.;
New Bedford, Mass.; Rome, N. Y.—Sales Offices in
Principal Cities, Distributors Everywhere.

Listen to *Exploring the Unknown* on the Mutual Network every Sunday evening, 9 to 9:30 p.m., EST.

DIVERSITY AND PROGRESS

(Concluded from page 226)

Even if immigration were prohibited, the result would be but little changed. A sufficient complex of races is already within our borders. For example, if there were no further immigration, the Japanese already here make it practically certain that 1,000 years from now every United States citizen will have Japanese blood.

Under the ferment of continual mixing we may thus expect continual expansion. The serious question is whether this will be held in check by universal custom in the one world we are in the process of making. Through radio communication, moving pictures, and the printed page a closer contact is being established between all parts of the world than ever existed before. These and government services must have a form that appeals to the majority. Under these common influences there is a tendency to make all the people alike and leave the world occupied by a mediocre race which lacks the diversity essential to progress. If this did happen, it might indeed mark the end of civilization, for when the present wave had run its course there would be no savage race to fuse with the decrepit stock and start a new era.

But there is strong reason to think this will not happen. When former civilizations decayed and died, it was in small nations where conditions were far more uniform than can ever exist in the entire world. Differences in geography and climate are sufficient to maintain differences in people. In the United States, for example, certain characteristics distinguish North, South, East, and West. People who move from one section to another quickly acquire the characteristics of the new section, and rarely retain the old for as long as a generation.

Diversity, the Basis for Progress

Unless forced by central or collective action, geographical diversity may thus be expected to persist. In a small community forced action is easily possible. But as the size of the community increases it becomes more and more difficult to get specific regulations which can be enforced. Ultimately, a critical size is reached such that enforcement is impossible. Our difficulties with prohibition and the bootleggers, with price control and the black markets, indicate that the United States is approaching the critical size. The debates in the United Nations organization suggest that the whole world exceeds that size.

We may expect that, whatever form of world sov-

eignty is established, local diversity will continue to supply the basis for progress. Countries in which things are done best will continue to have greatest strength and their methods will finally prevail.

Many would say this analysis is not pertinent since it takes no account of the new atomic developments; that reckless use of the forces thus introduced may set a period to civilization itself.

To people who have fixed ideas as to how the world shall be run, this atomic era does bring a shock, but for progress itself — that is a different matter. All history indicates that when attack is stronger than defense, progress is rapid. The reason, of course, is that the weakness inherent in wrong methods is more quickly exposed and these methods are swept away. For example, only a few years ago the United States government compelled its citizens to limit production. Now there is not enough of anything and half the world is faced with starvation. In a secure world, possibly we could permit limitation of production and merely depress the standard of living throughout the world, but that is much less likely when at any moment we may face the test of strength.

As to destroying civilization, I doubt whether people who make that suggestion realize what they are saying. Suppose, for example, in an attack with atomic bombs all the towns in the United States of more than 2,500 population were completely destroyed. This is greater destruction than any I have seen suggested. A town of 2,500 inhabitants is hardly more than a village. The material required for such an attack exceeds the foreseeable resources of any group of hostile nations. Nevertheless, let us assume every town of 2,500 inhabitants or more completely wiped out. At the end of that operation the United States would still have more inhabitants and greater resources than it had when I was born. Starting from that level, my generation raised this country to a height never attained by any other nation. If necessary, I am confident your generation would do that again.

Thus we have reason to believe conflicts between nations and ideologies can only check the rate of progress and not change its ultimate nature, that diversity of population already exists and whether we have peace or war will steadily increase, that conditions throughout the world differ too widely for any form of uniform regimentation, and that, under the diversity thus assured, progress in the sense of working less, having more, and living longer will be the future experience of the majority of mankind.

HAROLD J. RYAN, INC.

Air Conditioning

101 PARK AVENUE

NEW YORK 17, N. Y.

Rogers Peet Company

MAKERS OF FINE CLOTHES for Young Men and Men Who Never Grow Old



Westminster Dog Show! Dogs of countless breeds the sportsman can admire or develop! Breeding and training a major medal winner is a real job—a job packed with dreams of the approach to perfection . . . At Rogers Peet

the same basic idea—the approach to perfection—is always uppermost in the mind of our Master Designer — perfection in fabric, style, tailoring and fit—perfection in clothes for young men, and men who never grow old.

FIFTH AVENUE at 41st STREET, NEW YORK 17, N. Y.
THIRTEENTH ST. at BROADWAY, NEW YORK 3, N. Y.
WARREN STREET at BROADWAY, NEW YORK 7, N. Y.
TREMONT ST. at BROMFIELD ST., BOSTON 8, MASS.

The right thing in everything men and boys wear.

HUMANITIES IN AN ENGINEERING SCHOOL

(Concluded from page 222)

In the terms we are using, a philosophical system has a structure very similar to that of a geometry. It is a collection of theorems or statements which derives its logical validity from the postulates and definitions upon which it is based. Whether or not one believes that philosophy has any relevance to actuality or has any practical use is really beside the point. A mathematician does not discard a non-Euclidean geometry because it has no application. He is interested in the primary truth-value of the system. Similarly, a philosopher, insofar as he acts like a philosopher, does not concern himself with the secondary truth-value of his structure. If he adds to it the injunction to believe, he does so as an individual human being, not as a philosopher.

Similarly, it is believed that economics would not suffer from the type of criticism suggested here. Criticism of this sort does come, of course, from the expert economist. For only to the extent that he is able to handle symbols skillfully and properly can he be called an expert. But such criticism and understanding do not come from a student who is being given a course in economics to round out his education.

It remains to indicate how, in an engineering school, the humanities are to be taught from this point of view. One answer was given a few thousand years ago in the Platonic dialogues. Socrates and the other participants of the dialogues discussed problems of precisely the type

which have been the concern of this paper. They did it, figuratively speaking, around a table.

Why cannot the same procedure be followed in an engineering school? Why cannot a thoroughly adequate foundation be given to the nonscientific studies by carefully selected reading assignments and subsequent discussion in seminars? Such a procedure would seem to be especially suited to a school of science. The basic proficiency in handling symbols is, supposedly, being given in the regular scientific courses. All that is really needed is some means to reflect the light of this proficiency upon nonscientific subjects. What better means of reflection can there be than a seminar or organized reading?

The reading lists, of course, will be dictated by the subjects under consideration. It is perhaps well to stick as closely as possible to the so-called classics of any field. The reason for this is simple and does not arise from intellectual snobbishness. One of the reasons why a classic is able to maintain its high status lies in the richness of its symbolism. It is much like actuality in that respect. A given occurrence in the physical world is amenable to many interlocking meanings and references, depending upon the system in which one wishes to consider it. It is so with a classic. It endures because men can find in it many meanings. Such a characteristic is valuable for a seminar, the avowed purpose of which is the study of meaning.

To anyone who has read the books of Scott M. Buchanan and Mortimer J. Adler, much of what has been said above will have a familiar ring. The reader may be assured that this is not a coincidence.

LEWIS-SHEPARD

The L-S Power Jacklift, built in both Platform and Pallet types, combines all the good features so long needed for economical, efficient materials handling by power, — Complete Finger-Tip Control insures maximum speed and maneuverability with Safety... Electric Brake applies instantaneously with release of power, — the quickest, smoothest, most dependable braking control... and Vertical Handle Operation permits use in congested areas heretofore inaccessible with this type of equipment.

**LEWIS-SHEPARD
PRODUCTS INC.**

251 WALNUT STREET
WATERTOWN 72, MASS.



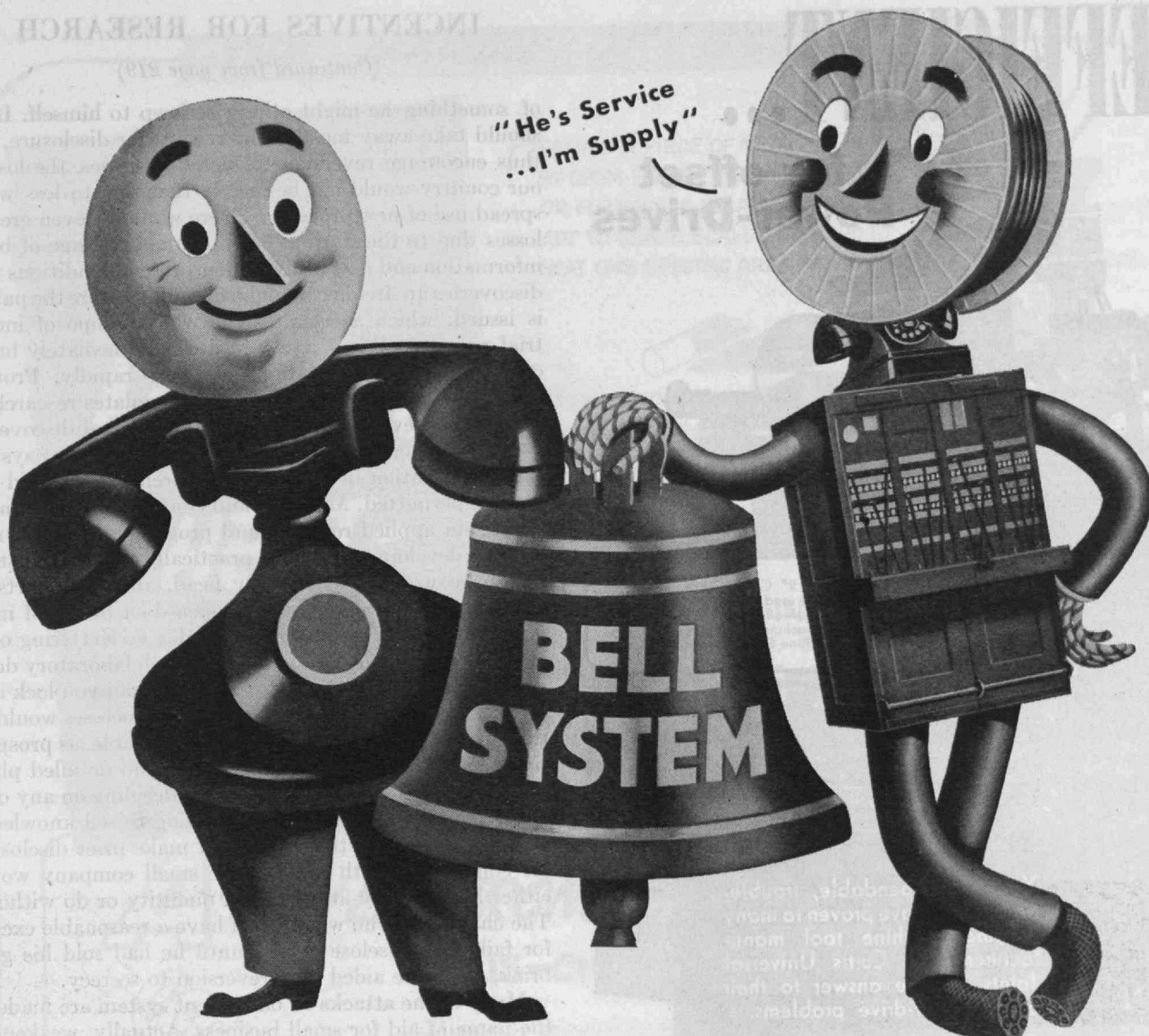
POWER JACKLIFT

Master of them all!

TWO SPEEDS FORWARD . TWO SPEEDS
REVERSE . ELECTRIC POWER LIFT .
ELECTRIC LOWERING . HORN FOR
SAFE DRIVING . INDIVIDUAL LOCK .
ELECTRIC BRAKE



SINGLELIFTS . HYDRAULIC HANDLIFT TRUCKS . JACKLIFTS . SKIDS . FLOOR TRUCKS . PALLET TRUCKS . STACKERS . PALLET STACKERS
PRODUCTION LIFTERS . CRANES . RACKS . ELECTRIC, GAS-ELECTRIC AND GASOLINE POWERED FORK TRUCKS . POWER JACKLIFTS



"Teamed-up for you since '82"

"WE'RE symbols of a unique industrial team that has been working for you for 65 years. With our research team-mate — Bell Telephone Laboratories — we've helped to give you the world's best telephone service at the lowest possible cost.

"My part of the job is to supply high quality products that meet exacting standards.

"I *manufacture* telephone equipment...*purchase* all manner of supplies for Bell Telephone Companies...*distribute* equipment and supplies to them from stocks maintained at my factories and my 29 warehouses...*install* central office equipment.

"Right now, I'm providing more telephone equipment and supplies than ever before. Using all my knowledge and skill, gained through years of experience, I'm going at top speed to catch up with the greatest demand on record.

"Remember my name... it's Western Electric."

MANUFACTURER... PURCHASER... DISTRIBUTOR... INSTALLER...

of 43,000 varieties
of telephone
apparatus.



of supplies of all
kinds for telephone
companies.



of telephone
apparatus and
supplies.



of telephone
central office
equipment.



Western Electric

A UNIT OF THE BELL  SYSTEM SINCE 1882

EFFICIENT...

for offset Power-Drives



Two 2" C652 Curtis Universal Joints used in transmitting power through offset main drive of milling machine made by The Product Machine Co., Bridgeport, Conn.

Years of dependable, trouble-free service have proven to many leading machine tool manufacturers that Curtis Universal Joints are the answer to their offset power-drive problems.

Curtis Joints have fewer parts — no threads to work loose and are precision fitted in assembly to insure a smooth, positive-action joint that gives maximum life with minimum maintenance — factors of real importance in power drives.

Available in 14 standard sizes from $\frac{3}{8}$ " to 4", either single or double. Quotations on special sizes, bores or tolerances gladly made, upon request.

Write for Engineering Data and drafting templates.



WRITE DEPT. B-5

**@ CURTIS UNIVERSAL
JOINT CO. INC.** SPRINGFIELD
MASS.

INCENTIVES FOR RESEARCH

(Continued from page 219)

of something he might otherwise keep to himself. If we should take away most of the reward for disclosure, and thus encourage reversion to secret processes, the loss to our country would not be merely that due to less widespread use of new processes. There would be even greater losses due to the slowing down of the exchange of basic information and new ideas. Under present conditions new discoveries are frequently published long before the patent is issued, which accelerates the whole tempo of industrial progress. When a new idea can immediately breed other new ideas, inventions multiply rapidly. Prompt disclosure of scientific information stimulates researchers in fields not even dreamed of by the original discoverer.

On the other hand, without an effective patent system early publication of industrial research work would seldom be permitted. Meetings and conferences of technical experts in applied research and progress reports on new lines of development would practically cease. Industrial espionage would rear its ugly head, and the efforts to prevent it would eliminate the open-door policy of most of our industrial laboratories. Charles F. Kettering once aptly said: "When you lock the research laboratory door, you always lock out a great deal more than you lock in."

Another unfortunate result of secret processes would be that small companies would no longer be able, as prospective licensees, to get full information and detailed plans on competitive new processes before deciding on any one. Even though the owners were willing to sell knowledge of a secret process, they could not make prior disclosure for comparison with others. The small company would either have to buy an unknown quantity or do without. The charlatan, who would then have a reasonable excuse for failing to disclose details until he had sold his gold brick, would be aided by a reversion to secrecy.

Many of the attacks on our patent system are made in the name of aid for small business. Actually, weakening our patent system and driving research underground would harm small business far more than it would big business.

Freedom, Incentives, Man Power

The inability to patent new devices would particularly handicap certain fields of engineering research. In chemistry, where a new process may depend upon temperature, pressure, or other reaction conditions which do not appear at all in the finished product, there is often a good prospect of keeping a process secret. It is therefore worthwhile to put time and money on developing such a process, even in the absence of a patent system. In most engineering fields secrecy is impossible. An automotive engineer who develops a new engine or a new hydraulic brake can keep his invention secret only until the day when the first car using it appears on the market. From then on any other automotive engineer can easily copy it, unless it is protected by patents. Without patents, incentives for research in most engineering fields would be greatly curtailed.

What, then, needs to be done to insure that research and science will aid our country as much during the next quarter century as during the past one? To overcome the various threats to the future of research which I have

(Continued on page 234)

THE MARCH OF SCIENCE

**MIRACLE
HEAT-**
without fire
or furnace!

HEATING A PIECE OF METAL BY OPEN FLAME, BLOW-TORCH OR FURNACE IS RELATIVELY SLOW—APT TO LEAVE SCALE...IT'S HARD TO HEAT ONE SPECIFIC AREA WITHOUT HEATING THE WHOLE PIECE.

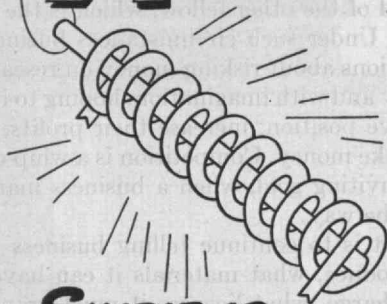


PRODUCTION MEN REALIZED HEAT-TREATING OPERATIONS SUCH AS FORGING, PRECISION BRAZING AND SURFACE HARDENING COULD BE STEPPED WAY UP IF A FASTER METHOD OF HEATING COULD BE FOUND... ONE WHICH WOULD CONCENTRATE THE HEAT AT PRE-SELECTED AREAS!



★ HEAT BY INDUCTION SEEMED LIKE THE ANSWER. SCIENCE HAD ALREADY DISCOVERED THAT METALS HEAT RAPIDLY WHEN INTRODUCED INTO A HIGH FREQUENCY, HIGH DENSITY MAGNETIC FIELD!

A NEW ELECTRONIC HEATER DESIGNED BY ALLIS-CHALMERS SCIENTISTS—



SIMPLE AS

- A PLACE METAL IN WORK COIL...
- B PUSH BUTTON
- C METAL IS HOT IN SPLIT SECONDS



AMAZING PRODUCTION TOOL RECTIFIES ORDINARY 60-CYCLE CURRENT THEN STEPS IT UP TO 450,000 CYCLES. A MAGNETIC FIELD OF HIGH DENSITY IS SET UP IN WORK COIL AND WHEN METAL IS INTRODUCED INTO THIS FIELD, PASSAGE OF CURRENT CAUSES POWER LOSSES WHICH PRODUCE HEAT WITHIN THE METAL WITH INCREDIBLE SWIFTNESS.

BIG BENEFITS: COMPLETE, SELECTIVE CONTROL OF HEAT PENETRATION... EXACT UNIFORMITY... GREATLY INCREASED PRODUCTION!

ALLIS-CHALMERS MANUFACTURING CO.

MILWAUKEE 1, WIS.

ELECTRONIC HEATER IS ONE MORE EXAMPLE OF HOW ALLIS-CHALMERS RESEARCH AND EXPERIENCE GO TO WORK FINDING BETTER, FASTER, MORE EFFICIENT WAYS OF HANDLING PRODUCTION PROBLEMS—ANOTHER GOOD REASON WHY A-C EQUIPMENT IS IN DEMAND IN EVERY MAJOR INDUSTRY...



ALLIS  CHALMERS

ONE OF THE BIG 3 IN ELECTRIC POWER EQUIPMENT
BIGGEST OF ALL IN RANGE OF INDUSTRIAL PRODUCTS



Gasoline spills on *your* fender leave ugly stains . . . but don't blame the attendant! Many cars cannot receive gas at full pumping speeds, and the attendant has no way of knowing when the tank is filled.

VENTALARM is the answer!

VENTALARM, in the gas tank, whistles while it works . . . the attendant can fill speedily, without danger of over-filling, as long as he hears the VENTALARM whistle. When it stops, he stops filling!

VENTALARM:

- protects car finish from unsightly gas stains
- eliminates spills . . . saves time and money
- provides for safety expansion zone in tank
- minimizes danger of flash fires

VENTALARM is standard equipment on Packard Clipper, Chrysler Imperial, Willys Station Wagon, and 12 makes of buses, trucks and taxicabs.

If you would like a VENTALARM for your car just write us. We will be happy to send you one, with our compliments, together with installation instructions.

*A million oil-heated homes enjoy VENTALARM fuel oil delivery. Driver never enters home . . . ask your oil company!

SCULLY SIGNAL COMPANY
CAMBRIDGE 41, MASS.
FRANK P. SCULLY, '15, President



INCENTIVES FOR RESEARCH

(Continued from page 232)

mentioned and which, make no mistake, are in the aggregate very serious, we need three principal things: first, sufficient man power; second, freedom of opportunity; and third, specific incentives for certain special cases.

To help overcome the shortage of properly trained man power, a sound government scholarship and fellowship program must be adopted and carried out. In addition to the help afforded veterans by the veterans' Bill of Rights, we must make sure that every man who is well qualified for scientific training is encouraged to complete his scientific education, and is permitted by Selective Service to do so.

An excellent program of government aid for scientific education and basic research was laid out in the report made to the President of the United States by Dr. Bush. In the last Congress that program failed of enactment into law largely because certain politicians and Washington bureaucrats insisted on trying to make the proposed National Science Foundation a new stronghold of bureaucracy. It is hoped that a sensible bill can be passed by the present Congress.

In order to furnish adequate opportunity and incentive for continuation of research, different things are required in various fields. I shall endeavor to summarize what seem to me the prime essentials in each major field.

Research by the Larger Industrial Companies

The main requirement for an expanded research program in industry is freedom. Industry must be free to work in its own way and free to reap the natural rewards from any advances it may make. It must also be free to try to get ahead of the other fellow, which is the essence of competition. Under such circumstances business men who make decisions about risking money on research will strike out boldly and with imagination, hoping to improve their competitive position, increase their profits, or find new ways to make money. Competition is a whip or goad, and profit an inviting goal, when a business manager is free to choose the way.

If government is to continue telling business what it can or must produce, what materials it can have, what prices it may charge, what licenses it must grant, what wages it must pay, and if government is to continue taking the lion's share of the profits in the form of taxes, there is certainly little incentive to expand our research and development programs.

Likewise, research can be discouraged by government domination or dictation of research programs or by government competition in industrial research. If the government does an adequate job of encouraging basic research and supporting military, public health, and agricultural research, it will have its hands more than full for many years to come. Tax-supported research in competitive industrial fields is essentially unfair competition and will discourage far more private research than the government could possibly carry out. Industrial research has been one of the outstanding achievements of our free enterprise system, and can thrive only in such an atmosphere.

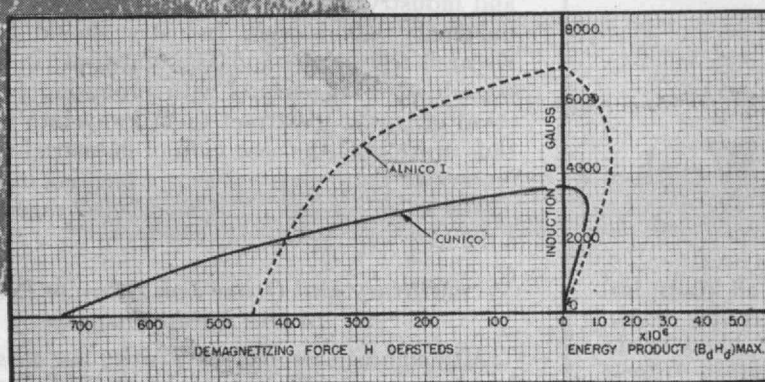
Nor do we need to worry about the way in which large companies will conduct themselves in an atmosphere of
(Continued on page 236)

Machineable CUNICO

GENERATOR ROTORS CAN BE OPERATED SAFELY AT 125,000 RPM

Cunico is the newest addition to the Arnold high quality permanent magnet line. It is a copper nickel cobalt alloy which has very high coercive force. Ductile, machineable and malleable, Cunico can be fabricated into a wide variety of simple and complex designs. Drawing, cutting, machining, punching and screw machine operations are practical.

Cunico can be magnetized in any direction, and is most efficient where a large cross section is available to produce sufficient total flux. Generator rotors are a typical application. A relatively short length is required to maintain the flux because of its high coercive force.



CUNICO CAN BE PRODUCED IN THE FOLLOWING SHAPES AND APPROXIMATE SIZES:

BARs— $\frac{1}{4}$ " to 1" square

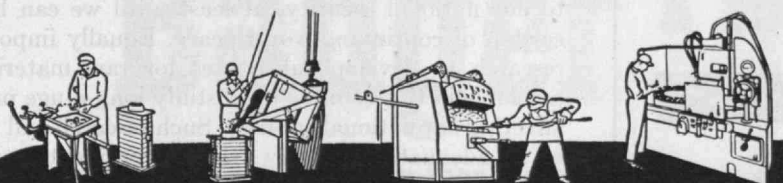
STRIPS—2" maximum width x .015" to .312" thickness

RODS— $\frac{1}{4}$ " to 1" in diameter

WIRE—No. 2 to No. 24 AWG sizes

CASTINGS—Maximum section 1" thick

Write today for details.



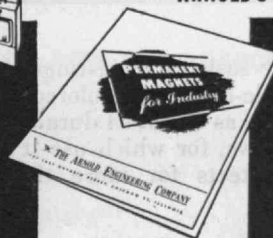
THE ARNOLD ENGINEERING COMPANY

SUBSIDIARY OF ALLEGHENY LUDLUM STEEL CORPORATION

147 EAST ONTARIO STREET, CHICAGO 11, ILLINOIS

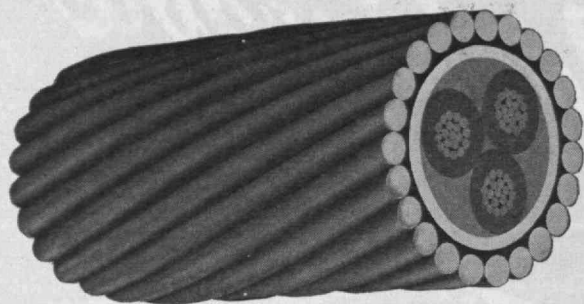
Specialists in the manufacture of ALNICO PERMANENT MAGNETS

ARNOLD'S TECHNICAL BULLETIN



"Permanent Magnets for Industry" suggests many ways in which the war-born improvements in permanent magnets can be most valuable to you. Send for it!

ONE AMONG THOUSANDS



OF POWER CORDS AND CABLES

designed by Simplex to meet
unusual service requirements.

Can we help you with your problems?

Call KIRKland 9000

SIMPLEX WIRES AND CABLES

SIMPLEX WIRE & CABLE CO.

79 Sidney St., Cambridge 39, Mass.



Reg. U. S. Pat. Off.

Samson Cordage Works

Boston 10, Mass.

Manufacturers of braided cords of all kinds, including sash cord, clothes line, trolley cord, signal cord, shade cord, Venetian blind cord, awning line, etc., also polished cotton twines and specialties.

SPOT CORD

Reg. U. S. Pat. Off.



Our extra quality sash cord, distinguished at a glance by our trade-mark, the colored spots. Especially well known as the most durable material for hanging windows, for which use it has been specified by architects for more than half a century.

INCENTIVES FOR RESEARCH

(Continued from page 234)

freedom. They are aware of their social responsibilities, and those which are not, are aware of the scrutinizing eyes of their customers. President Karl T. Compton has recently noted on the part of industry an "increasing interest in fundamental research, a more liberal interpretation of company policy, and an increasing tendency to co-operate with other companies in the industry or with universities." But industry must have at least a chance to make good profits from ventures which turn out to be successful, in order to offset the increasing cost of the failures.

Industrial Research by Small Companies, Foundations, and Universities

As I have indicated previously, to stimulate industrial research by other than large operating companies, it is essential to assure adequate incentives outside of operating profits. Our patent system is the best method ever devised, because the reward depends on the actual importance of what a man discovers. However, attacks on our patent system and some of our courts have weakened the protection afforded, particularly to the independent inventor who cannot afford a long-drawn-out litigation. John Anderson, an independent inventor of note, has said: "People seldom plant gardens where thieves abound." It is high time we again recognized the tremendous part which our patent system has played in encouraging research and invention. As Lincoln did when he made the statement, we must recognize that "the patent system has added the fuel of interest to the fire of genius."

Basic Research in Our Universities

In addition to strengthening our universities for their training functions, it is important that both government and industry increase their support of basic research in university laboratories. Industry should finance more research fellowships and assistantships; it should make consulting arrangements with promising professors, instead of trying to attract them away into industry and thus destroying the seed corn of industrial research. Engineers, in particular, need more training in the methods and tools of research, and more encouragement to take advanced work at our universities.

Military and Other Long-Range Research in the Public Interest

Although neither the universities nor most industries have any particular incentive to engage in military research, intensive research along those lines is essential to our national security, at least until we can be more certain of continuing world peace. Equally important is research to develop substitutes for raw materials not available in this country or to study long-range problems affecting our national security. Such research will be done on an adequate scale only if the government finances it. While there will be need for some centralized government laboratories in some of the above mentioned fields, experience between the two wars has indicated that government laboratories which do not maintain close contact with active industrial research are very likely to get into ruts and seldom make far-reaching advances. Of a list of

(Concluded on page 238)

DECADES OF EXPERIENCE

in
PROCESSING
DESIGN
ENGINEERING
CONSTRUCTION

for the
PETROLEUM
CHEMICAL
PETRO-CHEMICAL
INDUSTRIES

E. B. Badger & SONS CO. • EST. 1841

BOSTON 14 • NEW YORK • SAN FRANCISCO • LOS ANGELES • LONDON • RIO DE JANEIRO

TRADE MARK
HEVI DUTY
REGISTERED U. S. PAT. OFFICE

Hevi Duty Electric Co.

Electric Furnaces

MILWAUKEE, WISCONSIN

Hevi Duty Precision Electric Heat Treating Furnaces are built in a large variety of types and sizes — for many heat treating operations — with temperature ranges to 2500° F. (1371° C.). They are standard production equipment in many national industrial plants.

Write for descriptive bulletins

HAROLD E. KOCH '22, President

ELTON E. STAPLES '26, District Manager, Cleveland

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES **HEVI DUTY** ELECTRIC EXCLUSIVELY
MILWAUKEE 1, WISCONSIN

KNOW CO₂

AND ITS MANY
HELPFUL APPLICATIONS



Write for this free check-list today... it's yours for the asking. Every potential user of DRY ICE and CO₂ should have a copy for reference... it offers suggestions for possible applications to your problems or processes. See how other industries put DRY ICE and CO₂ to work for them.

Liquid
RED DIAMOND
Gas and Dry Ice

Many applications, perhaps, can be adapted to your needs. New uses are discovered constantly.

THE LIQUID CARBONIC CORPORATION
3110 South Kedzie Avenue
Chicago 23, Illinois
Branches in Principal Cities of the United States and Canada

INCENTIVES FOR RESEARCH

(Concluded from page 236)

the 18 most important American inventions compiled by the United States Patent Office with the assistance of the leading American scientists, industrialists, and statesmen, not a single one was made in a government laboratory!

If such laboratories are to do a good job in the future, they must maintain outside contacts, rotate their personnel, and farm out many of their projects to laboratories which are particularly qualified to follow certain lines of investigation and to supply new points of view. The new Navy research program emphasizes such farm-out contracts and seems particularly well adapted to achieve good results.

Research in Public Health, Agriculture, and Forest Products

In several fields endowed with substantial public interest the commercial operations are private enterprises but are generally on such small scale that adequate research is not likely to be carried out. The fields of agriculture, public health, and forest products are cases in point. In these fields, government research has already achieved substantial success, but the work should be broadened, more adequate salaries should be paid, and more projects should be farmed out to university and industrial laboratories. Industry has the advantage of being trained to get a specific answer in a limited time instead of allowing researches to drag out indefinitely, as so often happens in government laboratories.

In spite of the clouds on the horizon, the achievements of research, both in peace and in war, are so great that research is bound to go ahead. If the public can be made to understand the need for adequate incentives and opportunities, we shall witness an era of scientific achievement which will dwarf that of the past. The confidence of industrial organizations in our country's future is to be seen in the amazing number of outstanding new laboratories which are under construction or have been announced.

Let us not become imbued with the idea, however, that research will flourish no matter what environment we provide for it.

We must use wisdom in maintaining a favorable environment for American research. While industry rather generally concurs with our leading scientists in urging government aid for basic research and training activities, it needs neither government aid nor any fancy new incentives in most fields of industrial research. If we will but wind up the barbed wire, burn up the red tape, and let the old incentives of hope for profit and for individual advancement get back into full operation, you may be confident that our free enterprise system will far outstrip its past achievements in the fields of research and invention.

Plan to attend the midwinter meeting of the Alumni of Metropolitan Boston, to be held the evening of Saturday, February 8, in Walker Memorial. President Compton and Dean Baker will be present. Dr. V. K. Zworykin, Associate Director, RCA Laboratories, will explain and demonstrate a complete black and white television system.

FOR TOP PRECISION

in measuring Angles
and Locating Work

... use these **TAFT-PEIRCE** Toolroom Specialties

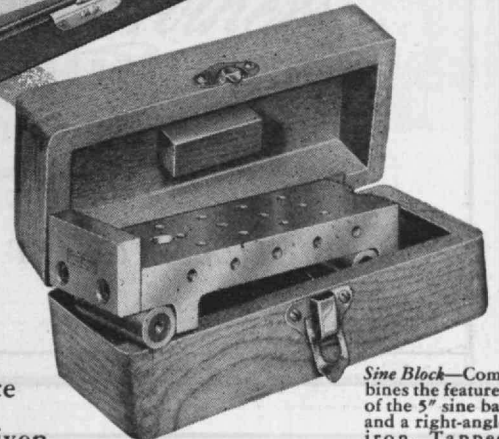
These tools are but a few of those available from Taft-Peirce stock for measuring angles and locating work to a given angle with the utmost accuracy. Tops in their field, they are a product of the Taft-Peirce Small Tool and Gage Division, and are indispensable for inspection and set-up departments in maintaining high standards of accuracy.

For further details of these and other angle-measuring equipment, write today for the new Taft-Peirce Handbook.

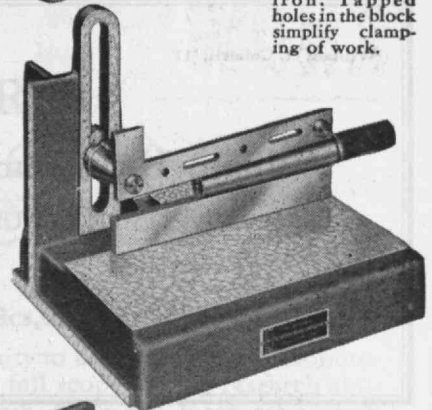
THE TAFT-PEIRCE MFG. COMPANY
WOONSOCKET, RHODE ISLAND



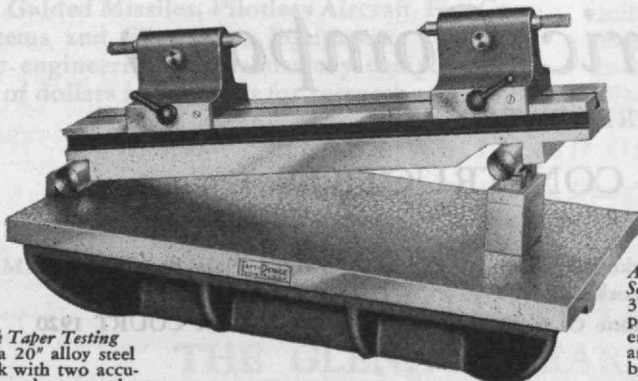
Sine Bar—For measuring angles accurately or locating work to a given angle within close limits. Available in 3", 5", 10", and 20" sizes.



Sine Block—Combines the features of the 5" sine bar and a right-angle iron. Tapped holes in the block simplify clamping of work.



Sine Bar Fixture—A sine bar, clamping device, and base constructed as a single integral tool. Available in 5 and 10" bar sizes. Invaluable in machining, grinding, and inspection departments.



Sine Block Taper Testing Fixture—A 20" alloy steel sine block with two accurately aligned center plugs. Especially useful for checking tapers with extreme precision.



Angle Block and Sine Bar Set—This set comprises a 3" sine bar and thirteen pairs of 4" angle blocks, enables the user to create any angle from 0° to 90° by ½° increments. Ideal for use on magnetic chuck face plate.

The
RUMFORD PRESS

CONCORD
NEW HAMPSHIRE



WHERE
Printing
IS STILL A CRAFT

William H. Coburn, '11

William F. Dean, '17

William H. Coburn & Co.

INVESTMENT COUNSEL

68 Devonshire St.

Boston, Mass.

SCIENCE, INDUSTRY, AND GOVERNMENT

(Continued from page 216)

In answer to these questions I do not pretend to be able to give a simple formula which would be applicable to all cases. But extreme views have been expressed in Britain on this subject.

It has been argued by some that all science investigations should be made in a central scientific department and none in the executive departments. It has been correspondingly argued by others that each executive department should have sufficient scientific staff to make all the research which it needs in the discharge of its own responsibilities. There are weighty economic reasons for the use of some, even if not all, common scientific services.

But, granted that there are some central scientific services, how can we insure that their work can be effective in the executive departments? It seems to me entirely unfair to expect the normal administrative staff of such departments to play the full role of user.

One solution of this difficulty is the appointment of a scientific advisor in each executive department who can identify the problems within his department which are suitable for scientific treatment, see that these problems are passed to the appropriate research bodies able to solve them, and interpret the incoming scientific material for the special purpose of his department. But I should stress that for such a scientific advisor to be effective it is necessary that he should be sufficiently senior in the department hierarchy. His advice should be tendered to the highest level — the level at which policy is decided.

I have so far stressed the value of the work of D.S.I.R. to government and, through government, to the community. But there is also another link with the community, and that is through industry. In this connection the Department serves industry chiefly by conducting research on generic fundamental problems on the basis of which industry itself can make applications. The greater part of this research is what I called objective fundamental research. In this case the main quest is understanding. Here the scientist seeks physical or chemical insight, and even atomic insight, into certain fields of practical importance. This may relate to the corrosion of metals, the oxidation of fats, the toughness of meat, the warping of wood, the electronic changes in the ionosphere, and so

(Continued on page 242)

Lord Electric Company

INCORPORATED

ELECTRICAL CONSTRUCTION

131 Clarendon Street
Boston 16, Massachusetts
Telephone COM 0456

10 Rockefeller Plaza
New York 20, N. Y.
Telephone CI 6-8000

1201 Plaza Building
Pittsburgh 19, Pa.
Telephone COURT 1920



Beginning, in many institutions, with members of the Class of 1818...and going right on, class after class, to the present day...Brooks Brothers have supplied ever-changing Clothes and Accessories which, through 128 years, have continued to win the particular approval and the special endorsement of Alumni, College Undergraduates and Students at Preparatory Schools everywhere.

46 NEWBURY STREET,
BOSTON 16, MASS.

714 SOUTH HILL ST.,
LOS ANGELES 14, CALIF.

111 SUTTER STREET,
SAN FRANCISCO 4, CALIF.

Brooks Brothers,
CLOTHING,
Men's Furnishings, Hats & Shoes

OFFICERS' UNIFORMS, FURNISHINGS AND ACCESSORIES

346 MADISON AVENUE, COR. 44TH STREET, NEW YORK 17, N. Y.

Unusual opportunity for

ELECTRONICS ENGINEERS PHYSICISTS • MATHEMATICIANS AERONAUTICAL ENGINEERS!

If you feel that your present connection does not offer maximum opportunity for expansion, here's your chance to go places in aviation, a field with a future! The Glenn L. Martin Co. has available a number of excellent positions . . . paying \$300 to \$600, depending on experience . . . for men with advanced college training and development experience. Interesting research work on Guided Missiles, Pilotless Aircraft, Fire Control Systems and Electronics Equipment. Unusually complete engineering and laboratory equipment . . . millions of dollars in contracts for research and devel-

opment in the electronics, missile and propulsion fields.

This is your opportunity to break away from monotonous routine and give full scope to your research ability. Associate now with America's foremost aircraft manufacturer, holding nearly one-fifth of all the aircraft orders in the nation . . . a company with a \$201,000,000 backlog of orders in such diverse fields as military aircraft, commercial aircraft, ground equipment, plastics, photography, gun turrets, etc. Write today, outlining your experience, and find out what Martin can offer you.

OTHER WELL-PAID OPENINGS

Engineers also needed as Draftsmen, Designers, Stress Analysts and Aerodynamicists. These are not just jobs, but well-paid careers with big futures.

WRITE IMMEDIATELY TO:

**TECHNICAL EMPLOYMENT SECTION
THE GLENN L. MARTIN COMPANY**

BALTIMORE 3, MD.

J. C. CORRIGAN CO.

Conveyers

Engineers • Manufacturers • Erectors
Coal Handling Systems
Materials Handling Equipment
Portable Conveyers

Distributors for

Jeffrey Manufacturing Co.
Jeffrey Parts Carried in Boston Stock

41 Norwood Street, Boston, Mass.

Tel. GENeva 0800



PRECISION-GAUGED HAIRSPRINGS AND FINE ROLLED WIRE

PRECISION PRODUCTS COMPANY

WALTHAM, MASSACHUSETTS

ROBERT I. BRADLEY '20

THE TRIAL IS NEVER OVER



GOOD-WILL is the disposition of the customer to return to the place where he has been served well—

**U. S. Supreme Court.
TO OUR FRIENDS**

We do not believe that any advertising copy man could have penned a neater and more trenchant definition than this decision of the Supreme Court.

It happens also to be the verdict which our customers have reached regarding their relations with us.

Your specific problems in technical reproduction work from the lowly blue print to the complicated offset printing of an engineering manual, will find their happy solution with us.

ELECTRO SUN COMPANY, INC.

Blue Prints — Photo Prints — Photo Offset

161 Washington Street

157 Chambers Street

Grand Central Terminal Building

NEW YORK, N. Y.

A. L. Weil '01

J. C. Duff '86

SCIENCE, INDUSTRY, AND GOVERNMENT

(Continued from page 240)

on. Armed with understanding, many practical problems are relatively easily solved. Very often a basic attack of this kind is the most fruitful and shortest route to the solution of a problem of practical importance. Also, very often quite unexpected and unsought applications are thrown up as by-products of such fundamental research.

Industrial Research

I now turn to the subject of industrial research which is conducted in Britain by private firms and by the industrial research associations. The larger firms, to an increasing extent, have their own laboratories, some of which are comparable in size and scope to the larger government research laboratories. But these laboratories exist mainly in the newer industries which were, in any case, born and bred on science and to whom scientific research is the life blood. In many cases such firms carry out not only applied research, but also objective fundamental research relevant to their own interests. They are, of course, at liberty to keep the results of their scientific work to themselves, but in general they follow an enlightened policy and their staffs are important contributors to the world's scientific literature.

With a view to stimulating research by private firms the British Government has recently introduced certain fiscal changes. For many years now it has been possible for a "trader" to count current revenue expenditure on scientific research undertaken in relation to his trade as a deduction in computing profits for income tax purposes. But as from April 6, 1946, provision has been made whereby capital, as distinct from current, expenditure, is allowable for income tax purposes by five equal annual installments. For this purpose capital expenditure may relate, for example, to the building of research laboratories or the installation of pilot plants.

It is admitted that research always pays a dividend if you do enough of it. But in considering industrial research in Great Britain, we are at once faced with the fact that more than 98 per cent of our firms employ less than 100 workers. To a small firm without considerable financial reserves industrial research on its own account must often appear as a risky adventure and beyond its means. This difficulty has been met to a considerable extent by the D.S.I.R. which is charged with the duty of encouraging research in industry.

The main method by which we have done this is by the formation of research associations, each on a co-operative basis, to serve the needs of particular industries. These research associations are self-governing bodies formed on a national basis. They are financed mainly by the contributions of their member firms but are also supported by substantial grants from the D.S.I.R., the size of which is related to the amounts raised by the industries themselves.

There are now 35 or more of these research associations and their expenditure on research is nearing £1,500,000 per year, having risen from a little more than £250,000 in 1934 to £500,000 just before the war. It would not be at all surprising to see this figure more than double in the next few years.

(Continued on page 244)

Investment Consultation Service



An Investment Consultation Account is one in which you employ the Investment Division of our Trust Department to advise you in the investment of your property. It is purely advisory; you continue to keep your own records and to handle your own securities. Its purpose is to help you establish a sound, well-balanced investment list.

Our Consultation Service offers you:

1. A review of your securities every three months, with recommendations for sales and purchases.
2. Continuing watchfulness by our organization for developments affecting your stocks and bonds and, when desirable, suggestions for changes.
3. Consultation with us in regard to your investments at any time.

Our officers will be glad to explain this service to you in detail.

The New England Trust Company

135 DEVONSHIRE STREET

At the Corner of Milk Street

BOSTON 7, MASS.

Member Federal Reserve System

WILLIAM D. NEUBERG COMPANY

Chemicals

GRAYBAR BUILDING 420 LEXINGTON AVE.

NEW YORK 17 N. Y.

TELEPHONE LEXINGTON 2-3324

SWISS AUTOMATICS

Rebuilding and Tooling Service

We have trained personnel and facilities for complete rebuilding and tooling of your Swiss Automatics and other type Swiss Machines.

YOUR INQUIRIES ARE INVITED

BORIS M. VOLYNSKY MFG. CO., INC.

311 West 66th Street

New York 23, N. Y.

Surface PYROMETERS for every purpose

The routine use of CAMBRIDGE Surface Pyrometers takes the guesswork out of temperature determination in many industries. The CAMBRIDGE is accurate, dependable, rugged, quick-acting and easy to use. The Roll Model is for checking surface temperatures of still or moving rolls. The Needle Model is for insertion into materials in a plastic or semi-plastic state for within-the-mass temperature determination. The Mold Model is for checking surface temperatures of mold cavities and surfaces of almost any contour.

Send for Bulletin 194SA.

CAMBRIDGE INSTRUMENT CO., INC.
3707 Grand Central Terminal
New York 17, N. Y.

CAMBRIDGE
PIONEER MANUFACTURERS OF
PRECISION INSTRUMENTS

Moisture Indicators and Recorders • Physical Testing Instruments
Surface Pyrometers • Laboratory Instruments for A. C. & D. C. • Galvanometers
Engineering Instruments • Gas Analysis Equipment • Physiological Instruments
and many other Mechanical and Electrical Instruments



SCIENCE, INDUSTRY, AND GOVERNMENT

(Continued from page 242)

For a very modest contribution — less than the cost of a single junior research worker — a small firm is enabled, by joining a research association, to share in research costing thousands of pounds, and in some cases hundreds of thousands of pounds a year. The research associations also keep their members informed on scientific and technical developments throughout the world, provide them with advice on their day-to-day problems, and insure that the industry as a whole has an opportunity of receiving early knowledge of developments likely to affect the future of their industry.

One thing which I am afraid tended to hinder the growth of co-operative research in the past was the rather touching belief of many firms that they possessed knowledge and trade secrets which were unknown to their competitors, and that this might be revealed if they collaborated in research. The manner in which firms had to work together in the war has done much to destroy this fear. An interesting side light on this matter are the remarks of the managing director of one of our leading aircraft firms. He said, "When the war began we thought that we knew a great deal more than our competitors, but when we were forced to share our knowledge with them we found they knew just about as much as we did and that the gaps in their knowledge and ours were about the same. What surprised us all still more was that when we had to share our knowledge with our American allies we again found that the gaps in their knowledge and ours were just about the same."

To Serve An Understanding Public

Perhaps I may be permitted to devote the last section of my discourse to personal views rather than to factual matters. I strongly believe that the scientific life should be one of intellectual adventure. It seems to me that this can characterize it whatever its objective. We must recognize and encourage the enthusiasm of the chase as well as the attainment of the objective. We need to break down the old false barrier between the so-called pure and applied divisions of science, for the whole field is essentially one and its parts are interdependent. We are sometimes sufficiently aware of possible practical applications not too far distant for such recognition to influence our choice of subject. But we must beware of too much restriction of the scientific front. That is the way of arrogance and folly. Man is not all prescient; and nature has many surprises.

As to the scientist himself, I believe that he should serve, and not dictate to, mankind. But he has the important dual mission, not only of uncovering nature, but also of interpreting it to his fellow men. If the conse-

(Concluded on page 246)



Transits and Levels are used on all largest works and by U. S. Govt. for utmost precision. Rental Insts. New catalog, just issued, sent gratis. A souvenir plumb-bob sent for 3¢ postage.

BUFF & BUFF CO.

Boston 30, Mass.

Henry A. Buff '05

McCREERY and THERIAULT

Building Construction

126 NEWBURY STREET

BOSTON, MASS.

THE MURRAY PRINTING COMPANY

A Complete Printing Organization
Letterpress :: Offset :: Binding

18 AMES STREET
CAMBRIDGE

BATH IRON WORKS CORPORATION

*Shipbuilders and
Engineers*

BATH, MAINE

FOR IMMEDIATE DELIVERY
Odd and Large Sizes a Specialty
1/8" to 72"

**LARGEST AND
MOST COMPLETE STOCK
on Atlantic Seaboard**

Shop Facilities for: Threading and Weld-
ing — All Sizes of Pipe — Welding
Fittings and Flanges, 1/2" to 24" Dia.

ALSO RECONDITIONED PIPE — VALVES —
FITTINGS FOR TEMPORARY SERVICE

If It's Made — Ask ALBERT!

● PIPE

Electric Weld
Seamless
Spiral Weld
Lap Weld
Butt Weld
Steel—Wrought Iron
Shore-Dredge

● VALVES

Iron Body
Forged Steel
Cast Steel
and
Special
Alloys

● FITTINGS

Welding
Tube Turns
Fabricated
Cast Iron
Forged Steel
Cast Steel Dresser
Malleable Victaulic

● PILING

ARMCO
Youngstown
Paints — Sleeves
all Specifications

S. G. ALBERT '29
Treasurer

ALBERT PIPE SUPPLY CO., Inc.

No. 13th & Berry Streets, Brooklyn, N. Y. EVERgreen 7-8100

LOUIS LONG, JR., PH.D.

CONSULTING CHEMIST

REPORTS • SURVEYS • RESEARCH

53 STATE STREET, BOSTON, MASS.

SYSKA & HENNESSY

Engineers

Consultation Plans Reports
Power Plant Water Systems Disposal Plants

NEW YORK, N. Y.

J. F. HENNESSY '24

**MONSANTO CHEMICAL
COMPANY**

Merrimac Division

**EVERETT
MASSACHUSETTS**

*The largest and oldest
chemical manufacturer in New England*

LEONARD CONSTRUCTION COMPANY

Engineers and Contractors

SINCE 1905

IN ALL THE AMERICAS AND FAR EAST

37 South Wabash Ave. 420 Lexington Ave.
Chicago New York City

Ingenieros S.A. de C.V., Mexico

SCIENCE, INDUSTRY, AND GOVERNMENT

(Concluded from page 244)

quences of scientific effort are understood by the community, any vital decisions on use must be taken together. Science is too serious a matter to be left to the scientists.

But here I am bound to confess that I see a certain danger, at any rate in my own country. I cannot but feel that there is a tendency in our educational system for scientific specialization to be introduced too soon. A scientific man should also be the complete citizen of the world. He should not only be fit to live, but also fit to live with. This can only be brought about if his later specialized training is based, and continues to be based, on a broad cultural background. Only in this way can the scientist enjoy the necessary human fellowship with the rest of mankind. With science destined to play such a vital part in moulding the future of our civilization, it seems essential that the public should make its own effort toward understanding science. Too often, and most regrettably, the average citizen is apt to associate science with magic.

As a first step in overcoming these defections I feel that we should start with our educational system which, I think all would agree, should not be merely an implement of vocational training. It is not necessary to be a maker of science in order to understand its history, its content, and its significance. There is a recently published American book which has made a great impression on many minds in my country. It is entitled *A State University Surveys the Humanities** and consists of a series of essays by members of the staff of the University of North Carolina. Among the many thoughtful and thought-provoking contributions to this scholarly volume there is one entitled "The Biological Sciences: The Sciences in the Humanities" by Dr. Robert E. Coker, who is strongly of the opinion that the general cultural value of science is not sufficiently appreciated in universities. He deplores the cultural distinction which is drawn between the arts and the sciences and believes "it arose and has persisted in part from the over-confidence of some scientists who have proclaimed a self-sufficiency for science. It derives also from the narrowly restricted vision of those who would teach the sciences as if they were useful only to equip individuals for earning a livelihood or to enable mankind to have more gadgets and physical comforts." In another passage in the same essay, Dr. Coker enunciates his main thesis simply and boldly. "The sciences," he claims, "take high rank among the humanities." I believe he is right if the sciences are taught as they could be and should be.

* Chapel Hill, North Carolina: The University of North Carolina Press, 1945. 276 pages. \$4.00.

PREPARATORY SCHOOLS FOR BOYS

CHAUNCY HALL SCHOOL

Founded 1828. The School that confines itself exclusively to the preparation of students for the Massachusetts Institute of Technology.

FRANKLIN T. KURT, Principal

553 Boylston Street, Boston, Mass.

HUNTINGTON SCHOOL FOR BOYS

Grades Nine to Twelve.

Thorough preparation for entrance to M.I.T.
and other technical schools.
Regular and summer courses.

320 Huntington Ave., Boston

Tel. Kenmore 1800

PROFESSIONAL CARDS

JACKSON & MORELAND

Engineers

Public Utilities — Industrials
Railroad Electrification
Design and Supervision — Valuations
Economic and Operating Reports

BOSTON

NEW YORK

H. K. BARROWS, '95

M. Am. Soc. C. E.

CONSULTING HYDRAULIC ENGINEER

*Hydro-electric Developments — Water Supplies. Reports, Plans,
Supervision. Advice, Appraisals*

6 BEACON STREET

BOSTON, MASS.

EADIE, FREUND AND CAMPBELL

CONSULTING ENGINEERS

500 FIFTH AVENUE NEW YORK 18, N. Y.

Plans and Specifications — Examinations and Reports

Power, Heating, Ventilating, Electric, Plumbing,
Sprinkler, Refrigerating, Elevator Installations, etc.,
in Buildings and Industrial Plants

J. K. CAMPBELL, M. I. T. '11

STARKWEATHER ENGINEERING CO.

INCORPORATED

*Engineers and Contractors for Pumping Plants
Boiler and Power Plants, Cooling Water
and Heat Recovery Systems*

246 WALNUT STREET, NEWTONVILLE

BIGelow 8042

Wm. G. Starkweather, M.E.

J. B. Starkweather, B.S.

Cornell '92

M.I.T. '21

H. A. KULJIAN & CO.

CONSULTANTS / ENGINEERS / CONSTRUCTORS

Specialists in

UTILITY, INDUSTRIAL and CHEMICAL FIELDS

1518 WALNUT STREET

PHILADELPHIA, PA.

H. A. KULJIAN '19

FABRIC RESEARCH LABORATORIES

INCORPORATED

*Research, Development and Consultation
for Textile and Allied Industries*

665 BOYLSTON STREET

Boston, Mass.

W. J. HAMBURGER, '21

K. R. Fox, '40

E. R. KASWELL, '39

GILBERT ASSOCIATES, INC.

ENGINEERS AND CONSULTANTS

Malcolm G. Davis '25, Vice President
F. E. Drake '05

Allen W. Reid '12
E. C. Edgar '35

Steam, Hydro, Diesel Power Plants; Industrial Structures;
Plant Safety, Labor Relations, Utility Rates, Valuations,
Reports; Large Scale Purchasing; Industrial Laboratory

Reading, Pa.
Philadelphia, Pa.

New York
61 Broadway

Washington, D. C.
Mexico City

FAY, SPOFFORD & THORNDIKE

Engineers

Airports — Bridges — Water Supply and Sewerage
Port and Terminal Works — Fire Prevention

INVESTIGATIONS

DESIGNS

SUPERVISION OF CONSTRUCTION

BOSTON

NEW YORK

WALLACE CLARK & COMPANY

CONSULTING MANAGEMENT ENGINEERS
SINCE 1920

Planning for Research and Development,
Sales, Engineering, Production, Finance,
Industrial Relations, Overall Management

521 FIFTH AVENUE

NEW YORK 17, N. Y.

Booklet describing our services and experience will be sent on request

MAURICE A. REIDY

Consulting Engineer

BRIDGES

BUILDINGS

STRUCTURAL DESIGNS

FOUNDATIONS

CONSTRUCTION CONSULTANT AND ARCHITECTURAL ENGINEER

Estimates and Appraisals

101 TREMONT STREET

BOSTON, MASS.

THE COSMA LABORATORIES CO.

1545 East 18th Street

Cleveland 14, Ohio

Chemical Analysis — Testing — Consulting Engineering
Testimony and Research

H. SEYMOUR COLTON, M.I.T. '21

R. W. FRISCHMUTH, Case '38

Director

Assistant Director

MORAN, PROCTOR, FREEMAN & MUESER

CONSULTING ENGINEERS

420 LEXINGTON AVENUE NEW YORK 17, N. Y.

Foundations for Buildings, Bridges and Dams;
Tunnels, Bulkheads, Marine Structures, Soil Studies and Tests;
Reports, Design and Supervision

Pardo, Proctor, Freeman & Mueser

Ingenieros Consultores

Ap. Correos 614, Caracas, Venezuela

WILLIAM H. MUESER, '22

GEORGE T. GILMAN, '23

PALMER RUSSELL CO.

Realtors

Real Estate Brokers

Property Management

Appraisals and Mortgages

1320 BEACON STREET

BROOKLINE, MASS.

Edgar P. Palmer '25

William W. Russell '22

FRANK MASSA

Electro-Acoustic Consultant

DEVELOPMENT — PRODUCTION DESIGN — PATENT ADVISOR

Loud Speakers — Microphones — Sound Powered Telephones

Supersonic Generators and Receivers

Electro-Acoustic Instruments

Underwater Sound

3393 DELLWOOD ROAD

CLEVELAND HEIGHTS, OHIO

AREA PLACEMENT CHAIRMEN FOR MASSACHUSETTS INSTITUTE OF TECHNOLOGY

*Each man listed below will have information about positions for
M. I. T. Graduates who want to locate in his particular area*

ALABAMA

ROBERT C. STOBERT '12, P. O. Drawer 1392, Birmingham

ARKANSAS

LESLIE A. JACKSON '09, Manager, Little Rock Municipal Water System, Little Rock

CALIFORNIA

EDWARD J. RILEY '09, Graybar Electric Company, Inc., Ninth and Howard Streets, San Francisco
FORD W. SAMMIS '28, 433 South Spring Street, Los Angeles 13

COLORADO

ALFRED E. PERLMAN '23, Denver and Rio Grande Western Railroad Company, Denver 1

CONNECTICUT

FREDERICK W. GREEN '32, Nash Engineering Company, Wilson Avenue, South Norwalk (Bridgeport area)
GEORGE L. MYLCHREEST '10, 238 Palm Street, Hartford
CHARLES E. SMITH '00, Railroad Office Building, New Haven

DISTRICT OF COLUMBIA

WILLIAM C. MEHAFFEY '17, 1630 North Greenbrier Street, Arlington, Virginia

FLORIDA

GEORGE W. SIMONS '15, Hildebrandt Building, Jacksonville
CLARENCE P. THAYER '23, 4212 N. W. Sixth Avenue, Miami
FRANKLIN O. ADAMS '07, 305 Morgan Street, Tampa

GEORGIA

WILLIAM E. HUGER '22, 11 Marietta Street, N.W., Atlanta 1

ILLINOIS

ROBERT W. CLYNE '30, American Steel Foundries, 400 North Michigan Ave., Chicago 11

INDIANA

FRANK C. BALKE '14, Balke and Krauss Company, 427 West Market Street, Indianapolis

KANSAS

FRED C. KOCH '22, Winkler-Koch Engineering Co., 335 West Lewis Street, Wichita

KENTUCKY

TINSLEY W. RUCKER III '31, The Crescent Panel Company, 32d and Market Streets, Louisville 12

LOUISIANA

THEODORE O. HOTARD '12, 221 Pelican Avenue, New Orleans 14

MAINE

FRANK A. KNIGHT '38, Eastern Corporation, Bangor
LEWIS D. NISBET '09, 44 Montrose Avenue, Portland

MARYLAND

GEORGE W. SPAULDING '21, 1605 Lexington Building, Baltimore 1

MASSACHUSETTS

ROBERT F. BURNETT '10, 85 North Main Street, Fall River
A. RUSSELL PIERCE, JR. '31, Palmer Scott Boatyard, New Bedford
LYNN WETHERILL '25, High Voltage Bushing Engineering Division, General Electric Company, 100 Woodlawn Avenue, Pittsfield
ALBERT D. KING '32, De Bell and Richardson, 3 Post Office Alley, Springfield

MICHIGAN

ADAM K. STRICKER '29, 1227 Bishop Road, Grosse Point Park, Detroit

MINNESOTA

LELAND CLAPPER '09, 5600 London Road, Duluth
CHARLES W. DREW '19, Minneapolis-Honeywell Regulator Company, Minneapolis

MISSOURI

HARRY L. HAVENS '09, Havens Structural Steel Company, 1713 Crystal, Kansas City
WESLEY W. WEDEMEYER '30, Wedemeyer and Hecker, Architects, 319 North Fourth Street, St. Louis 2

MONTANA

WALTER R. C. RUSSERT '18, Anaconda Copper Company, Butte

NEBRASKA

JOHN M. HANLEY '30, Northern Natural Gas Company, Aquila Court Building, Omaha

NEW HAMPSHIRE

BLAYLOCK ATHERTON '24, 142 Main Street, Nashua

NEW JERSEY

GEORGE A. CHUTTER '21, 109 Central Avenue, Glen Rock (Newark area)

NEW YORK

ANDREW F. ALLEN '12, State Department of Health, Albany
THOMAS H. SPELLER '29, General Engineering Company, 785 Hertel Avenue, Buffalo 7
JOHN C. FRUIT '02, Equitable Life Assurance Society of U. S., 393 7th Avenue, New York 1
RAYMOND G. BROWN '16, Comstock and Westcott Inc., Niagara Falls
C. KING CROFTON '22, 1132 Lincoln-Alliance Bank Building, Rochester 4
A. J. TACY '27, Room 645, Building No. 2, General Electric Company, Schenectady
J. MURRAY HASTINGS '13, 606 Hills Building, Syracuse

OHIO

JAMES B. HOLDEN '30, 276 Sundale Road, Akron
KENNETH A. WRIGHT '19, Johnson Service Company, 1905 Dunlap Street, Cincinnati 14
CHARLES B. ROWLEY '12, Charles Bacon Rowley and Associates, Keith Building, Cleveland
JAMES H. BLODGETT '20, Superintendent, Division of Sewage Treatment, Columbus
EUGENE HERZOG '27, 26 Cliff Street, Dayton
CHARLTON P. WHITTIER '27, Owens-Illinois Glass Company, P. O. Box 1035, Toledo 1

OKLAHOMA

W. J. SHERRY '21, 804 Kennedy Building, Tulsa

OREGON

ROBERT E. CUSHMAN '06, 618 N. W., Front Street, Portland 9

PENNSYLVANIA

PERCY TILLSON '06, 3003 North Front Street, Harrisburg
EDWARD J. HEALY '23, Philadelphia Brewing Company, 6th and Clearfield Streets, Philadelphia 33
HAROLD L. LANG '09, Carnegie Institute of Technology, Pittsburgh 13
G. C. WILSON '15, 907 East King Street, Lancaster
LOUIS MORSE '96, York Corporation, Roosevelt Avenue, York

RHODE ISLAND

DONALD G. ROBBINS '07, c/o International Braid Company, 47 Charles Street, Providence

TENNESSEE

DANA M. WOOD '06, 619 Union Building, TVA, Knoxville
DONALD W. SOUTHGATE '11, Nashville Trust Building, Nashville 3

TEXAS

JONATHAN A. NOYES '12, 1914 Commerce Street, Dallas 1
JOSEPH H. McEVoy '21, 202 McGowen Avenue, Houston 6

UTAH

GEORGE M. GADSBY '09, Utah Power and Light, Kearns Building, Salt Lake City

VIRGINIA

DONALD N. FRAZIER '11, 1226 Mutual Building, Richmond

WASHINGTON

HOLLAND H. HOUSTON '24, 215 Fifth Street, Olympia (Seattle area)
HOMER C. BENDER '09, 921 East 19th Street, Spokane

WISCONSIN

PHILIP N. CRISTAL '17, 720 East Wisconsin Avenue, Milwaukee 2

TECHNOLOGY MEN IN ACTION

THE ALUMNI FUND — ITS PROBLEMS AND GROWTH

Present *and* Future

When the fall term opened last September, our enrollment figure of 5,200 was higher by 50 per cent than at any previous period in the Institute's history. The problems entailed in adequately handling such a large group were many, but not insoluble. The teaching staff was greatly enlarged. Expanded laboratory and classroom facilities were made possible by the use of temporary and permanent buildings taken over from wartime research activities. Additional housing was provided by the erection of new structures and the conversion of existing areas into temporary dormitories. Through these and other means the situation was met.

It is not possible to forecast how long today's exacting demands will continue. The Institute has educational obligations which it must fulfill, and it is clear that even when the present peak has passed a permanent expansion of the Institute's operations will be necessary. Inevitably, its financial burdens will increase as a consequence, for no student ever pays the cost of his education in full. The recently announced rise in tuition will help but will come nowhere near closing the gap. Meanwhile inflation continues, endowment income is at a low point, and operating costs mount at an ominous rate. During the next few years the Institute's financial resources will be severely strained.

In this situation the Alumni Fund strikes a stabilizing note. This year the Institute will benefit from our annual giving by an amount roughly equivalent to the income from an increased endowment of $3\frac{3}{4}$ millions of dollars. Each year since its inception in 1940, the Fund has given increasing evidence of assuming a role of real importance in the financial future of M.I.T. With the co-operation of every one of us, it can achieve even greater things.

TECHNOLOGY MEN IN ACTION

M.I.T. MEN AT WAR

Up to January 21 over 9,686 Institute Alumni, including 38 Admirals, 14 Commodores, and 100 Generals, were reported as being in the active naval or military service of the United Nations. Among the new promotions to be reported are Commodore Richard M. Watt, Jr., '23, and Brig. Gen. Edward W. Smith '24. There were 337 Alumni who had been decorated, and 230 who had made the supreme sacrifice.

With its issue dated November, 1942, The Technology Review began publishing "M.I.T. MEN AT WAR." Although hostilities have ended, The Review plans to continue this page for the next several months in order to record information on M.I.T. men in the services which, to date, has been impossible to obtain. As a matter of convenience, promotions and corrections in the rank previously given are grouped under a single heading, "Changes in Rank." The Review Editors are greatly indebted to the many Alumni and other readers who are continuing to co-operate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

NEW DECORATIONS

- 1909 Riefkohl, Rudolph W., Col., U.S.A., Legion of Merit—for service as director of supply, Third Service Command.
- 1917 Schoonmaker, Lucas E., Col., U.S.A., Knight Command Order of Orange-Nassau (Netherlands Government)—for outstanding service while commanding officer of the United States forces in Surinam, Dutch Guiana.
- 1922 Bowles, Edward L., as Special Consultant to the Secretary of War, awarded the Distinguished Service Medal.
- 1926 Ogren, Cecil C., Capt., U.S.A., Legion of Merit—for exceptionally meritorious service as production assistant, and production planning control officer, at Watertown Arsenal, Watertown, Mass.
- 1930 L'Esperance, Stanley G., Maj., U.S.A., Bronze Star.
- 1934 Cunha, George M., Comdr., U.S.N., Distinguished Flying Cross—for service as squadron commander of a torpedo bomber squadron in attacks on major enemy airfields in Tokyo Bay area; Air Medal with Gold Star—for service as squadron commander of a torpedo bomber squadron in attacks on enemy airfields and shipping in Luzon, Formosa, French Indo-China, Nanpo Shoto, and Japan.
- Jacobson, Saul B., Lt. Col., U.S.A., Bronze Star—bridge construction across Moselle River, France, and Rhine River, Germany.
- Shepherd, Daniel F., Lt. Col., U.S.A., Croix de Guerre.
- 6-45 van Ravenswaay, Robert C., S. Sgt., U.S.A., Purple Heart—Germany.

NEW LISTINGS

U.S.A.

- 1924 Stewart, George W., Col.
- 1942 Brown, Russell W., Pte.
- 9-46 Battle, Clarence L., Jr., Maj.
- Beeson, Thomas H., Lt. Col.
- Harrison, Thomas D., Maj.
- Loughlin, Walter J., Capt.
- Luker, James A., 2nd Lt.
- Rethman, Vincent C., Maj.
- Stemen, Roger F., Maj.

U.S.N.

- 1939 Kaufman, David, S. 1c.
- 9-46 Blough, Ira K., Jr., Lt. Comdr.
- Bowen, John S., Lt. Comdr.
- Crawford, John W., Jr., Lt. Comdr.
- de Poix, Vincent P., Lt. Comdr.
- Duke, John M., Jr., Lt. Comdr.
- Field, Henry C., Jr., Lt.
- Forward, Lyle F., Ens.
- Garrett, Wallace H., Jr., Lt. Comdr.
- Gerber, Theodore E., Lt. Comdr.
- Goodfellow, Alexander S., Lt. Comdr.
- Gooding, Robert C., Lt.
- Hasler, William A., Jr., Comdr.
- Hauk, Hamilton O., Comdr.
- Hennessey, Thomas V., Lt. Comdr.
- Hinman, Jack J., 3d, Lt. Comdr.
- Jensen, Donald T., Lt. Comdr.

- Jones, Stuart C., Lt. Comdr.
- Joslin, Royal K., Lt. Comdr.
- Kelley, Archie P., Lt. Comdr.
- Kintner, Edwin E., Lt. Comdr.
- Knowlton, Negus W., Lt. Comdr.
- LaSpada, Jack A., Lt. Comdr.
- Lloyd, Henry F., Lt. Comdr.
- Naymark, Sherman, Lt. Comdr.
- Pickett, Ben B., Comdr.
- Ralston, Frank M., Lt.
- Rawson, Ralph W., Lt. Comdr.
- Riley, Richard, Lt. Comdr.
- Rudden, Thomas J., Jr., Lt. Comdr.
- Saveker, David R., Lt. Comdr.
- Schneider, Raymond J., Lt. Comdr.
- Simons, Waldo W., Lt. Comdr.
- Weschler, Thomas R., Lt. Comdr.
- Whiteside, George A., Lt.
- Wright, Clarence C., Lt.
- Yates, Alan H., Lt. Comdr.

U.S.C.G.

- 9-46 Leising, Charles E., Lt.
- Perry, Ellis L., Lt.
- Renshaw, Loy W. A., Lt.

CANADA

Navy

- 1935 Bance, Pierre, Lt. Comdr.

CHINA

- 10-44 Mao, Tsui-Chu, Capt., Army.
- 9-46 Liu, Yung, Ens., Navy.

CHANGES IN RANK

U.S.A.

- 1913 Achard, Francis H., Maj. to Lt. Col.
- 1919 Derby, Henry S., Lt. Col. to Col.
- 1922 Bainbridge, William W., Capt. to Maj.
- 1924 Smith, Edward W., Col. to Brig. Gen.
- 1926 West, Stanton L., Capt. to Maj.
- 1929 Hoffman, Richard T., Capt. to Maj.
- Reed, C. Wingate, Capt. to Col.
- Zak, Frederick J., Lt. Col. to Col.
- 1930 Ehrigott, Herbert W., Maj. to Col.
- 1931 Poor, Raymond S., Capt. to Maj.
- 1932 Hall, W. Penn-Gaskell, Jr., Capt. to Maj.
- Lucas, Kenneth B., Maj. to Lt. Col.
- Moses, Lowell M., Capt. to Maj.
- 1933 Fletcher, Leslie S., Capt. to Col.
- 1934 Jacobson, Saul B., Maj. to Lt. Col.
- Ragland, William W., Lt. to Col.
- 1935 Coombs, Raymond H., Maj. to Col.
- 1936 Herb, Edward G., Lt. Col. to Col.
- 1937 Dreyer, Christian F., Lt. Col. to Col.
- Pickard, Oliver J., Lt. Col. to Col.
- Slonneger, Glen R., Maj. to Lt. Col.
- Vahlberg, Robert W., Capt. to Lt. Col.
- 1938 Michel, John F., Lt. to Maj.
- 1939 Dudley, John H., Capt. to Col.

CASUALTIES

- 1925 *Franks, John B., Brig. Gen., U.S.A.
- 1942 *McNall, Burt C., Sgt., R.C.A.F.
- 6-45 *Frye, John R., Pte., U.S.A.—airplane crash.

FOR DISTINGUISHED SERVICE

A partial listing of decorations received by M.I.T. Alumni in World War II.
(Concluded from the January Issue)

DISTINGUISHED SERVICE MEDAL

- 1922 Bowles, Edward L., as Special Consultant to the Secretary of War.

DISTINGUISHED FLYING CROSS

U.S.N.

- 1934 Cunha, George M., Comdr.

LEGION OF MERIT

U.S.A.

- 1909 Riefkohl, Rudolph W., Col.
- 1926 Ogren, Cecil C., Capt.

PURPLE HEART

- 2-44 Freeman, Roger M., Jr., 1st Lt.
- Lawson, James T., 1st Lt.
- Wagman, Joel L., 1st Lt.
- 10-44 English, Wallace A., Pte.
- Sciandra, Carmon J., Pfc.
- Werner, George H., S. Sgt.
- 6-45 Pearson, Donald L., Lt.
- van Ravenswaay, Robert C., S. Sgt.
- 2-46 Simon, Richard C., Pfc.

U.S.N.

- 1912 Wyman, Dwight M., Lt. Comdr.
- 1920 Pennoyer, Frederick W., Jr., Rear Adm.
- 1921 *Healy, Howard R., Lt. Comdr. (posthumously)
- 1923 *Fleming, Robert W., Capt.
- 1940 Di Giannantonio, Edmond P., Lt.
- 10-44 Guptill, Frank E., Jr., A.R.M. 2c.

U.S.M.C.

- 1939 Demange, Robert C., 1st Lt.
- 1943 Wilcox, Julian, Capt.

ALLIED DECORATIONS

Knight Commanders of the Order of the British Empire

1911 Kenney, George C., Gen., U.S.A.

Order of the British Empire

1931 Mesick, Benjamin S., Col., U.S.A.

Military Cross (British)

- 1939 Pope, Gordon A., Maj., U.S.A.

Order Cloud Banner (China)

1917 Hegenberger, Albert F., Maj. Gen., U.S.A.

Yun Hui Banner Medal (China)

- 1935 Eng, Jim, Lt. Col., U.S.A.

Chinese Army and Navy Air Medal

- 1940 Seedlock, Robert F., Col., U.S.A.

French Croix de Guerre

- 1917 Collins, Hubert W., Col.
- 1922 Warren, Ross B., Col., with Palm.
- 1924 Gegan, John B., Lt. Col.
- 1927 *Cuthbertson, Harry B., Lt. Col., with Gold Star.
- Waugh, Sidney B., Capt.
- 1928 Sakouta, Vitaly M., 2nd Lt., with Star.
- 1931 Mesick, Benjamin S., Col., with Palm.
- 1933 Newton, Carroll T., Col., with Palm.
- 1934 Locke, Edward B., Jr., Lt. Col., with Gold Star.
- Moody, Robert L., Maj., with Silver Star.
- Shepherd, Daniel F., Lt. Col.
- 1935 Bemis, Hal L., Lt. Col., with Palm.
- Kelakos, Michael G., Lt. Col.
- 1939 Leghorn, Richard S., Lt. Col., with Palm.
- Pope, Gordon A., Maj.
- 1940 Weinbrenner, George R., Lt. Col.

French Legion of Honor degree of officer

- 1921 Moses, Raymond G., Brig. Gen., U.S.A.

Order of Kutuzov, 2nd Class (Russia)

- 1921 Scott, Stanley L., Maj. Gen., U.S.A.
- Shingler, Don G., Brig. Gen., U.S.A.

Order of the Fatherland's War, First Class (Russia)

- 1926 Mattson, Robert E., Col., U.S.A.

Russian Order of Alexander Neusky

- 1942 Kellogg, William W., Capt., U.S.A.

Order of Crown of Italy

- 1917 Hegenberger, Albert F., Maj. Gen., U.S.A.

Order of Homayoun, 3d Class (Iran)

- 1926 Mattson, Robert E., Col., U.S.A.

Aztec Eagle (Mexico)

- 1927 Glantzberg, Frederic E., Col., U.S.A.

Belgian Croix de Guerre

- 1942 Kellogg, William W., Capt., U.S.A.

Order of William (Netherlands)

- 1942 Kellogg, William W., Capt., U.S.A.

Knight Command Order of Orange-Nassau (Netherlands)

- 1917 Schoonmaker, Lucas E., Col., U.S.A.

National Order of the Southern Cross (Brazil)

- 1927 Williams, Milo R., Capt., U.S.N.

* Died in Service

★ Killed in Action

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Technology Club of Albany

The Club held a dinner meeting at the Wellington Hotel on November 21. W. H. Locklin '30, J. F. Longley '33, and G. C. Myrick '25 were welcomed back after good service in the armed forces. A committee was appointed to draw up a new constitution and set of bylaws, to the end that we may organize better to carry out a more active program. We had as our special guest and speaker Henry B. Kane '24, director of our Alumni Fund, who gave an illustrated talk full of information and interest on birds, bugs, and beasts, which met with its usual enthusiastic reception. —GEORGE W. SCHAIBLE '30, *Secretary*, New York Telephone Company, 158 State Street, Albany, N.Y.

M.I.T. Association of Cleveland

The Lake Shore Country Club was the scene of the latest gathering of the Cleveland clan, on November 21. Presiding was Doc Smith '23, who has recently taken the burden of presidential responsibilities from Chuck Reed '20.

On this occasion, the Association had the rare good fortune to welcome, as guest, Everett M. Baker, who will shortly relinquish his duties as pastor of Cleveland's First Unitarian Church to assume the office of dean of students at the Institute. Dr. Baker gave a brief résumé of his impressions of the Institute and outlined as well some of the plans and policies in the offing. Those who were meeting Dr. Baker for the first time were taken with his sincerity, his genial optimism, and particularly with the manner in which he regarded his new undertaking as a challenge.

Doc Smith then introduced Louis B. Seltzer, editor of the *Cleveland Press*. Mr. Seltzer gave a most interesting account of his impressions of the present world scene. He drew attention to the manner in which certain minority groups and foreign countries were exploiting to their own advantage the present state of turmoil and confusion within the United States. His comments stimulated some good questions, and it was with reluctance that Doc Smith called the discussion period to a close in time for adjournment.

Most of the old gang were on hand, including F. W. Crosby '90, W. A. Cleveland '98, Allen Gould '10, Chuck Reed '20, Bill Robinson '24, Howard Ferguson '27, Dick Young '37, Fred Reuter '38, and Chuck Smith '42. Alumni new to Cleveland included Bill Folberth, Jr., '41 and Lew Fykse '41. Norm Klivans '40 would not postpone his honeymoon to join us on this occasion. —CHARLES H. SMITH, JR., '42, *Secretary*, Steel Improvement and Forge Company, 970 East 64th Street, Cleveland 14, Ohio.

Indiana Association of the M.I.T.

The regular monthly meeting was held on December 11, at the Athenaeum, 401 East Michigan Street, and was made a ladies night, since the program would be of interest to both men and women.

The Association had a delightful time during the dinner and half-hour social period after the meal. At 8:00 P.M. the group adjourned to the Murat Theatre across the street, at the invitation of the American Telephone and Telegraph Company, to attend a demonstration and lecture by J. O. Perrine, Assistant Vice-president of the company, on radar and microwaves, covering the basic principles, techniques and apparatus of electric wave phenomena for the purpose of electrical communication. An interesting demonstration showed the existence of radio wavelength in space and illustrated what was meant by the wavelength of a radar radio wave. With his particular faculty for making technical subjects seem alive, Dr. Perrine described the marvels of radar — the "electric eye" that enabled our fliers to "see" through fog and smoke and the blackness of night. He illustrated various interesting phenomena associated with "short waves" — using them to light a fluorescent lamp held in mid-air with no connecting wires, bouncing them off metallic surfaces, passing them through certain materials, and "bending" them around corners by means of wave guides. Throughout his talk he touched on the application of these and other recent developments to peacetime uses.

The Association is indebted to the Telephone Company for a delightful and instructive evening, in which nine members and eight guests participated. —JOHN H. BABBITT '17, *Secretary*, 3734 Carrollton Avenue, Indianapolis 5, Ind.

Southwestern Association of M.I.T.

A dinner meeting was held on December 4 at the Hotel President in Kansas City, Mo. Paul M. Chalmers, assistant director of admissions for the Institute, was our guest and speaker of the evening. His talk was an exceedingly interesting one in which he not only explained what is being done at the Institute to cope with the large number of students and at the same time to keep up the high standards of instruction but also dwelt upon the nonengineering courses now required of all students. These courses are designed to equip Institute graduates with more of the knowledge needed for the understanding not only of problems of business and society but also of world affairs. Professor Chalmers concluded his talk with a brief discussion period, in which he answered questions relating to the Institute.

Twenty Alumni and 12 principals of our local high schools were present. The meeting was adjourned at 10:00 P.M. by

Mark Culbreath '30, President. —REGINALD W. BULKLEY '27, *Secretary*, 840 Westover Road, Kansas City 2, Mo.

M.I.T. Club of Milwaukee

The Club held its first annual business meeting in five years on December 5 at the University Club. New officers were elected; activities for the coming year were discussed; and the name of the Club was changed from Technology Club of Milwaukee to M.I.T. Club of Milwaukee.

The newly elected officers are as follows: President, David G. Smith '31; Vice-president, Frank E. Briber, Jr., '43 (Mr. Briber is also chairman of the program committee); and Secretary-Treasurer, William Hahn '42. A board of directors was created which includes these officers and also the following committee chairmen: Philip N. Cristal '17, placement committee, George W. Pollock '21, dinner committee, and A. Preston Heintz '38, membership committee. The retiring officers, Bruno H. Werra '32, President, and Warren A. Bjorn '34, Secretary-Treasurer, have been of great help in getting the Club started again, and they deserve a real vote of thanks from all the Alumni in this area. —WILLIAM HAHN '42, *Secretary*, 750 North 14th Street, Milwaukee 3, Wis.

M.I.T. Club of the Province of Quebec

The Club held a luncheon meeting on November 20 at the Windsor Hotel in Montreal. Professor Erwin Haskell Schell '12, head of the Department of Business and Engineering Administration at Technology, was our guest speaker. Professor Schell gave us a spirited account of the main developments of the past few years at the Institute. We learned how the student housing problem was satisfactorily solved in spite of the record enrollment of about 5,200. We were also given interesting details about some further projects, such as the new library, the milk bar, and so forth.

Club members present numbered 40, as follows: 1897: D. J. Spence; 1900: W. S. Hart; 1907: E. C. Richardson; 1908: H. S. Chandler, F. J. Friedman; 1909: J. N. Stephenson; 1910: C. A. Robb; 1911: Paul Kellogg; 1912: E. O. Upham; 1915: Huet Massue; 1916: Aimé Cousineau, J. C. Merritt; 1921: A. T. E. Smith; 1923: H. C. Pearson, G. L. White; 1925: G. E. Rouseau; 1926: Louis Bérubé; 1927: A. E. Bourbeau; 1928: C. S. Carter; 1930: J. L. E. Langevin, René Laplante; 1931: L. A. Fraikin, W. M. Keddie; 1933: S. J. Hungerford; 1934: C. P. Beaubien, Henri Gaudet, J. M. Raymond; 1935: N. H. Bell; 1936: F. D. Mathias; 1938: R. B. Douglas, E. H. McCann; 1939: F. B. Grant, E. R. Hammond, A. N. Miller; 1940: George Kaneb, J. R. Laurence; 1941: R. A. Frigon; 1943: W. B. Terry, Jr.; 1945: F. G. Leroux; 1946: H. A. Audet.

By virtue of an agreement with the M.I.T. Club of Lower Ontario, the following 10 counties located in eastern Ontario now form part of the territory of our Club, namely: Carleton, Dundas, Glengarry, Grenville, Lanark, Leeds, Prescott, Renfrew, Russell, and Stormont. Alumni living in those counties of Ontario are nearer Montreal, our headquarters, than Toronto, and it is to accommodate them that the agreement was arrived at. — JACQUES R. LAURENCE '40, *Secretary*, Ecole Polytechnique, 1430 St. Denis Street, Montreal 18, P.Q., Canada.

New Haven County M.I.T. Club

The first meeting of the 1946-1947 season was opened at 8:15 P.M. on October 30 at Strathcona Hall with a welcome by the President, Larry Grew '27, to the various groups in the audience, which included 110 members and guests of the Hartford club and guests from Yale University, through whose co-operation the use of Strathcona Hall was made possible. President Grew introduced Hudson Hastings '07, professor of economics at Yale, who related several interesting experiences he had had with Dr. Compton while both were residing in Seattle, Wash. Professor Hastings then presented Dr. Compton.

Dr. Compton prefixed his remarks by indicating that his talk would be in three parts: (1) a discussion of Institute activities — the construction of new buildings, the establishment of new courses in fields of science and engineering which have blossomed during the war, changes in faculty and students and changes in finance and budget; (2) an introduction to the film of the Bikini bomb tests, in the course of which attention was called to some of the phenomena which would be seen and certain points to watch for in the film, followed by a showing of the awe-inspiring colored films of the tests themselves; (3) Dr. Compton's justification of the use of the bombs at Hiroshima and Nagasaki. Based on his knowledge of the plans for the invasion of Japan and of the Japanese plans and determination to resist to the end, Dr. Compton concluded that the bombings were actually more humane and saved lives by ending the war quickly. If the war had continued until Japan was overrun, as he believes it would have been necessary to do, the losses in lives and property would have been far heavier, he thinks, than those caused by the bombs at Hiroshima and Nagasaki. In addition, both towns were legitimate military targets. Dr. Compton's observations and conclusions were made while serving on President Truman's personal committee for the atomic bomb test and the Joint Chiefs of Staff's evaluation board for the 1946 atomic bomb test. He had no responsibility in the making of the decisions to bomb Hiroshima and Nagasaki; hence his remarks were made without the prejudice of one having to justify the course of action taken.

After Dr. Compton's talk, the meeting was opened to questions from the audience, which he answered in so far as the information requested was not restricted. — WALTER S. WOJTCZAK '37, Dwight Building Company, 152 Temple Street, New Haven, Conn.

Technology Club of New York

By the time you read this bit of delayed information, you will have heard from President Dandrow '22 more of the details about our recent move. For reasons beyond our control, your correspondent has had to withhold the news of our separation from the Williams Club, with whom we have shared headquarters for the past nine years. There was no major or minor disagreement between the two clubs, and we take our leave on good terms. As for Technology men, I am sure that it will eventually work out to have been an excellent move. Time will tell whether the Williams Club comes out ahead or not. It is nothing more than a case of the traffic being more than the facilities can handle. The officers and governors of your Club have given much consideration to our future plans: we know our objective, and will reach it as soon as conditions permit. We have no financial problems, and when the dust clears away, the M.I.T. Club of Greater New York (which will probably be our new name) will be in splendid shape to offer you quarters where you will feel at home, and you will be able to call it your own Club.

We regret to note the passing of Warren F. Wolf '43 of White Plains, N.Y., on October 29, 1944; Thomas Harper, Jr., '33 of Woodhaven, N.Y., on April 3, 1945; Winthrop P. Tenney '93, 80 Maiden Lane, New York City, on May 18; Joseph H. Sinclair '08 of 59 Wall Street, New York City, on May 24; John Tetlow '07, Massapequa, N.Y., on July 8; and Walter M. Drury '03 of 969 Fifth Avenue, New York City, on July 16.

During November the following Tech men were elected to membership in the Club: Almer F. Moore '29, Rockville Centre, N.Y.; Jack L. Staunton '35, 28 East 73d Street, New York City; Gordon Y. Billard '24, 115 Broadway, New York City; John Allan Gunnarson '46, Westinghouse Electric Company, New York City. We had several resignations during the month, among which were those of Winfield H. James '40, Bissell Alderman '35, William H. King '94, and E. A. von Reutter '44. Although we naturally regret losing any of our members, your Secretary notes that most of the above are among the more recent graduates. No doubt these men left because of a change in job; but let us hope that younger men will also join in numbers, for it is they who must eventually maintain the reputation and good name of the Club here in New York.

Let me remind any of you who wish information on the Club, while in New York during the interval of our moving, to get in touch either with George Dandrow, Johns-Manville Company, Lexington: 2-7600, or with your Secretary, McGraw-Hill Publishing Company, MEDalion: 3-0700. We will do whatever we can for you gladly, and can probably do a thing or two which the clubhouse never tackled. — WILLIAM W. QUARLES, *Secretary*, McGraw-Hill Publishing Company, 330 West 42d Street, New York 18, N.Y.

Technology Club of Philadelphia

Garland Fulton '17 has announced a dinner and meeting at Kugler's on January 6 for the nominating committee, composed

of the following: Claude A. Anderson '05, Hugo H. Hanson '12, Joseph Greenblatt '22, Franklin E. Washburn '26, John Lawrence '32, John K. Jacobs '37, and Samuel K. McCauley '41. The energetic manner in which Captain Fulton has taken over this job assures the Club of an outstanding group of officers and executive committee members for the year 1947.

The officers of the Club are considering favorably a suggestion by Secretary Locke '96 of the Alumni Association, and by the time this reaches you our new name will probably be the M.I.T. Club of Philadelphia. Our Club was interested in the recent announcement by President Compton of the appointment of H. E. Lobdell '17, recently dean of students at the Institute, to the new position of executive vice-president of the Alumni Association.

Our relations with Lobby in the past, both as a speaker before our Club and in connection with the work of our scholarship committee, have been very pleasant, and we wish him every success in his new job, which we believe will be a great asset to the future growth and functioning of the alumni clubs. Although some changes may be made at the annual meeting, our regional scholarship committee, headed by Greville Haslam '15, includes the following members: H. W. Anderson '15, P. M. Alden '22, C. W. Stose '22, E. J. Healy '23, W. H. MacCallum '24, G. T. Logan '29, and Proctor Wetherill '34.

Burkhart Kleinhof '39, as chairman, expects to have the reception committee functioning at the January meeting. It is hoped that this will provide a better opportunity for guests and newcomers to this area to meet our present members. Attention is called to the fact that our Club holds three meetings a year, on the third Tuesdays of October, January, and May. Any Alumni or friends of M.I.T. are cordially invited to these meetings. Among the guest speakers at the January meeting we expect E. L. Cochrane '20, Vice-admiral, U.S.N., who is chief of the Material Division in the Navy Department, to speak informally on his trip to Bikini to observe the effects of the atom bomb on naval construction. Next year Vice-admiral Cochrane will become head of the Department of Naval Architecture at the Institute. Following a pleasant custom which was interrupted by the war, we shall hold our spring meeting on Tuesday, May 20 at the Hotel Du Pont in Wilmington, Del., a fitting gesture in view of the large number of our members who live in that city.

Your Secretary has received notice of the death on November 7 of R.G. Woodbridge, Jr., '07. Mr. Woodbridge had been associated for some time with the Du Pont Company and held the post of chemical director of the smokeless powder department. On November 25, our genial member, Ed Whiting '15, appeared in a large photograph in the feature section of the Philadelphia *Inquirer* in true Thanksgiving costume. Each year the Mayflower Society holds a special Thanksgiving service in the famous Old Swedes Church here in Philadelphia on the Sunday before Thanksgiving, and our fellow member, Edmund Alden Whiting, apparently because of his rotund ability to fit perfectly into one of those Pilgrim costumes with hat and all, appeared prominently in the

front line of the picture. We hope that John Alden's smile was as infectious as that of his descendant.

It was recently announced that Karl Fernstrom '10 has been appointed vice-president and director of production with the American Machine and Foundry Company. He formerly held the equivalent position here at the Cramp Shipbuilding Company. E. J. Healy '23 is recovering from a bad attack of virus pneumonia. Henry F. Daley '15 was recently appointed district application engineer of the middle Atlantic district of the B. F. Sturtevant division of the Westinghouse Electric Corporation. James McGowan '08 has been named president of the Campbell Soup Company.

For information about Alumni in the Philadelphia area, call Jefferson 5-0642. — ROBERT M. HARBECK '28, *Secretary*, 605 Foss Avenue, Drexel Hill, Pa. *Assistant Secretaries*: SAMUEL K. McCauley '41, 288 Copley Road, Upper Darby, Pa.; FRANK S. CHAPLIN '32, 822 Glendalough Road, Philadelphia 18, Pa.

The Technology Club of Rochester

On a beautiful Saturday in September (the 28th) — a day reminiscent of August cast in among the shivering companions of a cool September — the Club gathered at Mendon Ponds Park for the annual meeting. Headquarters were at the East Cabin, overlooking Hundred Acre Pond and a rolling ball field. Early in the afternoon the younger members organized the traditional ball game, in which the even classes compete against the odd. Again in strict tradition, the score of the fray was lost in the dust of battle. It had been a good summer, and the crops ripened well, so that beer was once more available. There were no steins, and even no glasses, but of bottles there were sufficient. Around the ice bucket gathered an increasing crowd of athletes, parched from their exertion, and of onlookers, parched from their observation. A picnic supper, prepared by Leo Lewis, caterer, was spread forth on the long table outside the cabin, and 39 club members sat down to participate. The quiet satisfaction was broken only by a constant murmur of conversation and by the loud chorsing of some old Tech songs, under the direction of Collin Alexander '39.

When the dessert had disappeared, Harold Akerly '10 called the meeting to order and introduced two distinguished members: Clarence Culver '96, member of the 50-Year Class, and Bill Vicinus '23, traditional host for the annual meetings of years gone by. About a dozen men who had returned from the services next stood and were welcomed appropriately. Other distinguished members who wished to stand were invited to rise, but none accepted.

Fred Kolb '38 read the Treasurer's report, in the absence of Harold Smith '39. The club has broken even on operating expenses and increased the size of its scholarship fund nest egg. John Ancona '03 reported on the activities of the scholarship committee and summarized the situation at the Institute. A year ago a number of qualified men who had returned from the services were admitted, most of them discharged officers. Then after September of last year came the

flood of applicants, some of them qualified, but most of them poorly prepared, and many of them hopeless. Seventy-five applicants in all applied from the Rochester area, of whom about three or four have been admitted. B. Alden Thresher '20, Director of Admissions, has graded applicants back from the services by a series of special examinations of the College Board type. Enrollment at present is more than 5,000. Plans for classes entering later and the disposition of teaching facilities have been left very fluid in the face of constantly changing conditions. Harold Akerly, in accepting the report, paid tribute to John Ancona's 18 years of service as chairman of the club scholarship committee and 15 years as honorary secretary for the Rochester area. The Club rose in appreciation of this job exceptionally well done.

Leon McGrady '17, chairman of the nominating committee, reported on the deliberations of his group. Members of the committee were C. King Crofton '22, M. Wren Gabel '39, Lee McCanne '27, and George A. Richter '13. McGrady prefaced his committee report with a comment on the entirely different procedure followed this year, whereby the nominating committee actually met and deliberated, examined the records of the Club and the lists of its members, and selected a list of nominees on the basis of their merit. McGrady commented further on the strange circumstances, arising this year, of a man's being nominated for president who had already been elected president in a preceding year. Ralph Peters '30 was elected for the year 1943-1944 but left for Oak Ridge, Tenn., before the first meeting. "Peters has had all the glory and none of the work of the president's job," McGrady said, "and since he was good enough to be elected president in 1943-1944, we propose him for 1946-1947!" The complete list of nominees selected by the committee runs as follows: President, Ralph W. Peters '30; First Vice-president, O. Glenn Goodhand, Jr., '31; Second Vice-president, Kenneth J. MacKenzie '28; Secretary, Frederick J. Kolb, Jr., '38; Treasurer, Collin H. Alexander '39; Executive Committee — for term expiring in 1947, Howard F. Carver '32, to replace Alexander, who resigned to become treasurer; for term expiring in 1948, James S. Bruce '39, to continue in office from last year; and for term expiring in 1949, Frederick J. Hopkinson '20. Harold Akerly called for additional nominations from the floor, but none were proposed. It was voted that the Secretary be instructed to cast one white ballot for the nominees as presented by the nominating committee. Akerly declared the list elected. The meeting adjourned, and the 40 members attending slowly dispersed homeward during the next several hours.

In his talk to the Club on November 21, Brian O'Brien '19 said that ever since the last war infrared signaling has been dreamed of as a military weapon. During this war, as chief of Division 16-2, "Illumination and Vision," of the office of Scientific Research and Development, Professor O'Brien has had a unique opportunity to be in touch with some of the fascinating projects of the National Defense Research Committee. O'Brien came to the Institute to grow old, he told the Club. Graduated from Yale during the last

war, he was too young for immediate service and spent a year at Technology growing older! He is now director of the Institute of Applied Optics at the University of Rochester.

Illustrating the importance of a simple idea, O'Brien exhibited a "triple mirror," a prism made by slicing off one corner of a cube. These triple mirrors, when accurately made, return light to its source with amazing accuracy over a wide angle of incidence. An aviator with a small flashlight held directly above his eye will see the star image reflected by the prism with only that one eye. It cannot be seen by both eyes unless he is more than one mile away from the mirror! Thus aviators with suitable lights on their helmets could see a row of stars along a dark runway lined with triple mirrors, while even the other occupants of their planes might see absolutely nothing.

The first attempts to develop simple signaling by the use of radiation were made with ultraviolet light. Ultraviolet is not truly invisible, O'Brien reported, and this early work showed that young eyes in particular are sensitive to ultraviolet and on down to wave lengths much shorter than had previously been suspected. The development of phosphors which could be activated by ultraviolet or blue light, and then triggered to phosphorescence by infrared, shifted the program to the use of infrared radiation. The simplest use of infrared was the metascopes, with one lens forming an image on a fluorescent screen and a viewing lens making this image easy to see. It was called a metascopes, O'Brien said, in order to have a "scientific" name which would at the same time conceal the use of the instrument. Many tactical applications of this metascopes are still restricted, but it is obvious that a binocular or monocular sensitive to infrared could have many applications in signaling with less fear of interception, in recognition of friendly forces, and in co-ordination of activities. Metascopes were made varying in weight from nine pounds down to a few ounces. A special rush order of metascopes for the Navy ahead of regular production was assembled by the research staff, thus proving that a Ph.D. on a production line can assemble instruments even faster than the ordinary girl worker!

The snoopscope and sniperscope are infrared, electron-tube instruments. They provide a source of infrared illumination and then use a special cathode-ray type tube to provide a high-resolution image of what is seen in the infrared. These instruments were very useful in the Pacific, O'Brien said, but the Germans had infrared so well developed that it would have been dangerous and foolhardy to use them in Europe. Infrared aerial photography provided excellent night reconnaissance without enemy knowledge that pictures were being taken. Planes flying low projected a line of infrared upon the ground and recorded what was reflected in a strip camera having continuously moving film synchronized with the plane speed. Much information was so obtained during the overcast weather following D-Day.

Planes attacking from the sun have been in a favored position since the beginning of aerial warfare. Seeing into the sun was made possible by the Icaroscope, another

fluorescent screen instrument. This instrument takes advantage of phosphors from which the afterglow does not depend greatly on the level of illumination. The original illumination gradient is retained up to a certain threshold, beyond which there is saturation. A screen showing suitable phosphorescence was illuminated with rapid flashes of light from the scene and viewed during the dark periods. With the instrument designed so that the brightest sky comes at the top of the linear response, the sun's apparent brightness was reduced from 1,000 times that of the sky to perhaps 10 times. Therefore, the whole sky was visible in the tones of an artist's conception, and planes could be observed approaching from any angle.

President Peters presented the recommendation of the Alumni Association's executive committee that the name of the Club be changed from the Technology Club of Rochester to the M.I.T. Club of Rochester. No vote could be taken since the required notice of the proposed change had not been given the membership. During the discussion no opposition was voiced. The count on attendance was 34. — FREDERICK J. KOLB, JR., '38, *Secretary*, Building 14, Kodak Park, Rochester 4, N.Y.

Tulsa Active

On the occasion of Professor Chalmers' trip to Tulsa, Okla., William J. Sherry '21 got together 14 local Alumni and former students for an evening dinner at the Tulsa Club on December 6. It was there decided to have another meeting in the latter part of January, with the prospect of organizing an M.I.T. Club of Tulsa. The following roster covers the 14 men attending the December meeting: David A. Bartlett '39, Alanson W. Chandler '37, John McC. Dom '31, Joseph D. Eisler '32, Theodore Q. Eliot '42, Joseph H. Feemster '06, John D. Fisher, Jr., '36, John R. Fitz-Hugh '37, John H. Leavell '07, Edgar R. Pettebone, 2d, '36, Bernard W. Sakmann '39, William J. Sherry '21, Daniel Silverman '29, and Walter S. Smith '30.

Worcester County Alumni Association of M.I.T.

The Association held its fall dinner meeting at the Sheraton Hotel in Worcester on December 12. W. Franklin Baxter '34, President, conducted a brief business meeting. Professor Locke '96 told of present activities at the Institute. Orville B. Denison '11, former President, then introduced Emmons J. Whitcomb '11, once a partner of the Raymond and Whitcomb Company. Mr. Whitcomb, discussing "Transportation, Today and Tomorrow," said that railroads in the West and Middle West are rapidly adding the most modern types of equipment, whereas the eastern roads are lagging behind in this respect. He thought the airlines to be at a critical stage of development, lately rapid and still advancing by virtue of technical progress during the war. And finally, he considers the American Merchant Marine the best in the world, with unexcelled facilities for carrying American exports everywhere.

Those present for the dinner meeting were the following: C. A. Read '91, H. M. Lath-

am '93, H. S. Kendall '04, F. N. Turgeon '04, A. B. Sherman '06, F. E. Banfield '07, O. B. Denison '11, F. S. Hunt '16, T. P. Kelly '18, E. P. Whitehead '20, H. O. Berry '22, R. H. Brown '22, A. J. Brockelman '26, R. N. C. Hessel '27, R. R. Smith '27, G. W. Browne '29, A. E. Jorjorian '30, G. D. Manter '31, H. F. Atwood '32, W. S. Crowell '32, M. G. Green '33, F. M. Johnson '33, W. F. Baxter, Jr., '34, C. H. Wilson '34, R. G. Clarke '35, A. J. Lari-vière '35, H. A. McCrensky '36, H. R. Gordon '38, R. N. Thompson '40, and D. M. Whitehead '45. — ROBERT G. CLARKE '35, *Secretary*, 17 Park Villa Avenue, Worcester 6, Mass.

CLASS NOTES

1888

We have to record the death of the "grand old man of '88," Henry French Eastman, on December 7 at his home in Westford, Mass. He was 86 in October, four years older than any other man in the Class because of having postponed his entrance to gain experience as a practical machinist. After graduation in June, 1888, he went to the Atherton Machine Company, Tewksbury, Mass., then to Norwich, Conn. In the spring of 1889, he worked for the Lancaster State Company as engineer and then went back to Technology as assistant in the applied mechanics laboratory. In the fall of 1890, he was employed by the Middlesex Machine Company as engineer for piping and ventilating buildings. He then worked successively for the Lowell Machine Company, for White Brothers and Company, leather manufacturers, as mechanical engineer, for the Fifield Tool Company in Lowell, and then for the National Calfskin Company in Peabody, Mass., where he remained for many years.

Eastman was the senior member of the famous triumvirate of Eastman, Foque, and Ellis. They attended practically all class and alumni meetings, and wherever you saw one, the other two were near by. Ellis wrote under date of December 11 that he drove out to Westford in September and found Henry in good spirits and as humorous as of old. Frank Cheney was present with Ellis at the funeral services on December 9 in the Talbot Memorial Chapel in Lowell. Eastman was known as the man with "the smile that never came off."

Ellis has four homes which he visits in rotation to see his daughters and their children in Melvin Village, N.H., Melrose, Mass., the Statler Hotel, Boston, and Wellesley, Mass. He spent the three weeks over Christmas at Melvin Village. — BERTRAND R. T. COLLINS, *Secretary*, 291 Nassau Street, Princeton, N.J. SANFORD E. THOMPSON, *Assistant Secretary*, The Thompson and Lichtner Company, Inc., Park Square Building, Boston 15, Mass.

1890

Bertram Lenfest has resumed his trips to the Pacific Coast, and to him the Secretary is indebted for information of the death of Burdett Moody on September 2. Moody was graduated in Course I, and when the Secretary visited South Dakota some five years later, he was engineer for the Homestake Mining Company. Later, he became

consulting engineer for the Burlington and Northwestern Railway and for the City of San Francisco. Moving to the Southwest, he continued for a short time to have some interest in mining and later became connected with the Pasadena water works, then with the Los Angeles department of power and water.

The following is quoted from the *Owl*: "Burdett Moody, former business agent of the Bureau of Power and Light and champion of Municipal Ownership, has gone. A review of his eighty years presents a record of accomplishment through courageous action guided by clear vision and rare wisdom. From 1916 until his retirement in August 1940, he gave the best part of his life as guiding genius to the development of the Los Angeles Water and Power Department. Boulder Dam is indeed concrete tribute to his tireless effort and influence in making that project a reality. As a speaker he carried the message throughout the Southland while Secretary of the original Boulder Dam Association. Charter members of the Speakers Club will recall that our Club was formed as an outgrowth of classes in public speaking. Perhaps a few know that those classes and our Club received the blessing of the Department through the then Public Relations Council. Still fewer know that Burdett Moody was a member of that forward-looking group which authorized our public speaking project. With a firm grasp of the situation at hand, a keen insight to potential possibilities, and just the right amount of imagination, he refused to let barriers — conditions or individuals — lower his sights from his objective target. The man, Burdett Moody, is gone, but his spirit and influence will be with us as long as there is a Municipal Department of Water and Power."

Moody was secretary-treasurer of the Boulder Dam Association, a member of the Chamber of Commerce and various other organizations. The Los Angeles board of water and power commissioners paid tribute to him in a resolution which stated that "he gave untiringly and unstintingly of his energies in the building of this citizen-owned public utility. His loyalty and devotion to democratic ideals and institutions contributed in a great measure to the growth and development of the city of Los Angeles and of the Southwest." He is survived by his wife and two daughters, who have the sympathy of the Class.

The Class extends congratulations to Willis Whitney on the addition of another to his long list of laurels when, on October 17, he received the first Industrial Research Institute medal "for outstanding contributions to the field of industrial research as a distinguished scientist, a pioneer of industrial research, and a leader and mold of men." — GEORGE A. PACKARD, *Secretary*, 50 Congress Street, Boston 9, Mass. HARRY M. GOODWIN, *Assistant Secretary*, Room 3-233, M.I.T., Cambridge 39, Mass.

1892

Congratulations are due George Ingraham on a fine exhibition of his water colors and oils at the Twentieth Century Club, 3 Joy Street, Boston, in the latter part of October.

Toward the end of November, the Secretary received a letter from Ralph Sweetser, enclosing a photograph of Locke, Sweetser, Parrish, and Hall, taken by Hutchinson at

our 30th reunion at the Wianno Club in 1932. The Secretary is keeping it with some others to show any classmate interested who may be able to get in touch with him sometime in Room 3-233 at the Institute.

Sweetser wrote as follows: "I am still in harness with my consulting engineering work and have recently returned from a trip to Cherokee County, Texas. I am now a registered professional engineer in Texas, as well as in New York State. A letter from George Rowell written early last summer said he was still with Day and Zimmermann, Inc., in the Packard Building, Philadelphia."

He also mentioned receiving a letter from Carleton Davis regarding the possibility of increasing the class contributions to the M.I.T. Alumni Fund. At the time of going to press, the Secretary has received from Sweetser a copy of his fall letter, in which he quotes from Carleton Davis a suggestion that our Class attempt to increase our contribution. Most, at least, of the members of '92 will have received this letter long before reading this issue of *The Review*, and I know we all hope he will receive a liberal response.

The Secretary is further indebted to Sweetser for a notice received from Miss Margaret I. Hutchinson of the death, on July 1, of Charles A. Brigham, IV, enclosing a clipping from the *Ridgefield, Conn., Press*, from which I quote: "Charles Angier Brigham, aged 75, a resident of Ridgefield for the past 15 years, died at his home on Danbury-Norwalk Road . . . after a two-week illness. Mrs. Brigham, the former Mora Neill Brigham, died six months ago. Born in Brockton, Mass., on February 15, 1871, Mr. Brigham was a son of the late Rev. Charles D. and Patience Gibbs Brigham. An architect by profession, he specialized in school buildings, and among the many public institutions he designed is the high school in his home town of Brockton. Prior to his retirement he was a member of the firm of Wilson and Potter in New York City, where he and Mrs. Brigham lived for many years. Survivors are several nieces and nephews."

The Secretary has also received a notice of the death of Charles F. Wallace at Whitefield, N.H., on September 11. Wallace was graduated in Electrical Engineering, and the Secretary is indebted to L. B. Buchanan of Stone and Webster for the following account of his career: "Mr. Wallace entered the employ of Stone and Webster in the fall of 1892. In the decade immediately following, the development of electric railways was very rapid, and Stone and Webster were widely engaged as engineers in the building of many of these, particularly including the necessary power stations. Mr. Wallace was assigned by the company largely to that work, and many railroad power stations were built under his personal supervision. Afterward, when the firm became directly interested financially in public utilities and undertook the construction as well as the engineering, he continued in an executive position with the engineering and construction department, predecessor of the Engineering Corporation. Consequently, he was connected with the management division and was a sponsor for some of the southern and central western companies. He was vice-president of the Stone and Webster Management Association, Inc. He retired

from the organization in 1918 at the close of some detached service for the government in World War I and thereafter conducted under his own name a consulting business in public utility engineering and development work until failing health and eyesight rendered it impossible. He had many warm friends in the organization and in the electrical business world who will regret his passing."

To Harry Carlson, the Secretary is indebted for a letter from Charles H. Muhlenberg, IV, in which he states that his nephew, F. A. Muhlenberg, has lately been elected to Congress. Charles H., Sr., has retired from active practice after some 53 years, but his firm is continuing under the name of Muhlenberg Brothers and is carried on by his son, Charles H., Jr., (M.I.T. '22) and a partner.

Our 55th reunion will occur next June, and the Secretary would appreciate receiving from his classmates any suggestions as to the manner in which we should honor the occasion. — CHARLES E. FULLER, *Secretary*, Box 144, Wellesley 81, Mass.

1894

Accounts of golden wedding anniversaries certainly make us realize that we are, as we say in New England, "getting along." One such event was recently reported in the *Somerville Journal*, the happy 50-year groom in this case being our own H. Osgood Lacount, or, as some of us knew him better, H. O. Recently he and his wife celebrated their golden anniversary in part by retracing the route of their wedding trip, but accompanied on this enjoyable motor tour by their daughter and her husband, Dr. and Mrs. Philip W. Card of Arlington. The Lacounts were married on October 14, 1896, in Webster. Mrs. Lacount was the daughter of Captain and Mrs. Thomas K. Bates of that town. For 50 years they have resided in West Somerville, where for many years they have been active in the church and community life of their neighborhood. Two children, Mrs. Card and a son, Sherwood K. Lacount, actor-owner of the community theater of Boothbay, Maine, came to bless their family life, and there are now also two grandchildren.

Lacount is one of our classmates who has had a career with a single company. Graduated in Mechanical Engineering in '94, he returned to Technology and was graduated again in '95 in Electrical Engineering. He was immediately employed by the inspection department of the Associated Factory Mutual Fire Insurance Companies, holding successively higher and higher positions, including those of assistant treasurer and manager, until his retirement, after 50 years of service, in 1943. He still frequents his old quarters and maintains a friendly interest there. His activities have been broad, and in addition to being president and treasurer of the College Avenue Methodist Church, he is a life member of the New England Water Works Association, and an honorary member and past president of the National Fire Protection Association. For many years the Lacounts have had a summer home at Cape Porpoise, Maine, and since his retirement have spent much of the summer season there. Without having any highly specialized hobbies, he always has a lengthening list of things that he wants

to do, and especially of those that may be helpful to other people. H.O. has thus solved the problem of how to retire successfully and with personal satisfaction.

A few weeks ago the Secretary was greatly pleased to receive a letter from Francis C. Green (Frank to his intimates), who expressed his appreciation of the class notes that appear from time to time. He recalled our first meeting, back in freshman year, and some of our later contacts. Although he entered with '94, he took a five-year course in Sanitary Engineering so was graduated and generally classified with '95. Some time ago he suffered a severe illness, from which he is recovering, though not yet completely well. Probably for this reason he did not tell of any special activities at the present time, but the address from which he wrote is 1200 15th Street, Room 401, Washington, D.C. We hope he will write again, and that his health is much improved.

The Secretary is making preparations for a six weeks' western trip. With his wife as a companion, he goes first to Cleveland for the annual meeting of the Refrigeration Research Foundation, Inc., of which he is chairman of the board of governors; then to Chicago and on to southern California for a combination of inspection work and pleasure and visits to old friends and relatives; thence to the Price Ranch, to which Mrs. Ray Price has kindly invited us for a few days; and so northward to the Bay District for conferences at the headquarters of the Research Foundation. A report on the trip may perhaps be given in a later issue.

Members of the Class will be pleased to know that W. J. P. Cullen of the Eastman Kodak Company has in preparation a volume in appreciation of the great services and remarkable character of our late classmate, Frank Lovejoy, recognized as one of the great industrialists of our time. It has been the good fortune of the Secretary to be able to give Mr. Cullen some facts, especially regarding Lovejoy's connection with M.I.T.

It is with a distinct sense of personal loss that the Secretary must record the death on December 21 of Horatio Newton Parker, whose illness was mentioned in the December number. Having been warm friends since our freshman year, and throughout our whole careers interested in the same general fields of professional work, the Secretary feels his passing at this time to be one more break in the circle of friendship that inevitably must grow smaller and smaller as the years pass. Vivid memories of student days are awakened — among them the days when we walked from the old building on Boylston Street across Harvard Bridge before it was open to regular traffic to Cambridge because we lacked the nickel for carfare, or to save it for less favorable days. Later years brought us together in public health work in bacteriology and at other meetings. Parker was born in Cambridge on February 3, 1871, the son of Horatio G. Parker, a Boston lawyer, and Harriet (Newton) Parker. He attended the Cambridge schools, was graduated from the Cambridge Latin (High) School in 1890, entered the Institute that year and elected the Course in Geology. His interest in sanitary subjects led him to do considerable work in Biology, and he did not take

the S.B. degree. After a year he returned as a special student and spent the academic year of 1895-1896 in public health studies.

On leaving the Institute he was for three years with the Boston Water Laboratory (later the Metropolitan Water Supply) as assistant biologist, working with the late G. C. Whipple '89, and while there was joint author of several important papers. From 1899 to 1901, he was chief biologist of the Metropolitan Supply. In 1901, he became the health inspector of Montclair, N.J., and this position was followed in 1904 by that of assistant hydrographer and assistant engineer in the United States Geological Survey, with special interest in hydrology. Through the co-operative relationships of the U.S.G.S. and the Kansas state department of health, he carried out much work on the Kansas state water survey, one of the early surveys of water resources of individual states. This work also brought him into close contact with dairy and milk supply problems. He left Kansas in 1910 to become the dairy bacteriologist of the college of agriculture at the University of Illinois, where he remained on the staff until 1917. He gave a course and lectures on municipal sanitation at Indiana University. He then resigned and returned to Boston, where he spent several months in the preparation of his book on city milk supply, which was immediately recognized as of prime importance in this field. In late 1917, he became associated with the *Delineator* in New York, as a specialist in matters of health. In 1918, he became the bacteriologist and chemist for the department of health of Jacksonville, Fla., and was soon made director of laboratories and sanitation, a position which he held with distinction until his retirement in 1945. His work in Florida was in some respects pioneering, and he was an important factor in the solution of some of the sanitary problems in the South, especially those relating to water and milk supply and abatement of fly and other nuisances.

Parker was a fellow of the American Public Health Association and a past chairman of its food and nutrition section, also of the American Chemical Society, the American Association for the Advancement of Science, the Society of American Bacteriologists, the American Dairy Science Association, the New England Water Works Association, the Florida Academy of Sciences, the American Microscopical Society, and other professional organizations. In 1924, he was president of the Association of Food and Drug Officials of the Southeastern States; in 1932-1933, president of the International Association of Milk Sanitarians; in 1931-1932, president of the Florida Public Health Association. He was a member of St. John's Episcopal Church and of the Riverside Lodge of the Masons and also held membership in the York Rite bodies. He married Margaret Irwin of Ness City, Kansas, on February 25, 1922, and they had three children, Jeanette, now at home, Horatio N., Jr., a student at Centenary College at Shreveport, La., following service in the war, and Margaret, a student at Mary Washington College, Fredericksburg, Va. The warm sympathy of the Class is extended to his wife and family. We shall remember him and his very useful

and distinguished life with deep respect and affection. — SAMUEL C. PRESCOTT, *Secretary*, Room 3-233, M.I.T., Cambridge 39, Mass.

1895

A late notice has been received of the death of Alfred F. Shurrocks of Nantucket on August 6, 1945. More details may follow later.

Ira A. Nay, 73, was found dead in his room at the Young Men's Christian Association in Auburn, Maine, on December 8. His death was ascribed to a heart ailment. He is survived by a son, Robert Nay of Nutley, N.J., and a brother, George Nay of Wellesley Hills, Mass.

Your Secretary was "vacationing" for the month of December in the New England Baptist Hospital in Brookline. His "secretary," not wanting to let *The Review* down, sent these few notes. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

1896

A note of only one sentence from Bradley Stoughton contained the information that on November 15 he returned to this country. The Secretary immediately asked him to supply further details, but nothing has been forthcoming to date. From another source, however, it was learned that Bradley has been in Europe and that his European tour included Switzerland.

Bertha Tucker wrote on December 3 that Charlie had gone to the Lawrence, Mass., General Hospital for a fortnight. She said that his hospitalization had benefited him greatly and that he was having good care with three nurses. — Ben Hurd's son, Junior, dropped in to see John Rockwell recently while in Cambridge. He is with the Du Pont people in Wilmington, Del., and John says that he seems to be standing up and showing the same fine qualities that Ben possessed.

Classmates will learn with much regret of the death of Mrs. Edith Rogers Bakenhus, which occurred on December 4, at the Vassar Brothers Hospital in Poughkeepsie, N.Y. It will be recalled that she became ill last June while on vacation at the Lake Mohonk Mountain House and was taken to the hospital in Poughkeepsie, where she has been ever since. Earlier reports in the class notes have indicated that she had shown some improvement, but it was also known that her condition continued serious. She had accompanied her husband during his entire Navy career, including various tours of duty in the United States and abroad. Her husband survives her, and also her daughter, Mrs. Dorinda Rogers Bakenhus Beck. Services were held at the Little Church Around the Corner, and John Tilley wrote that they were attended by Sager, Trout, and himself.

Another short story from Bob Flood should be a fitting close for these notes: "I remember once when I was offered a job at a small theater in Boston, as 'treasurer' they called it — but I was to sell tickets — I went to see Gran Merrill (George A. Merrill '92) to talk it over. 'But Gran,' I said, 'suppose some of our fellows showed up there with ladies and saw me selling tickets — what would they think?' 'See here, Bob,' he broke in, 'get this into your system: no honest work is beneath a gentle-

man.' I raced right back to the theater. *But the job was gone.*" — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge 39, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge 38, Mass.

1897

The following Washington notes may be of interest to members of the Class. Commander and Mrs. F. A. Hunnewell are in Cocoa, Fla., at the Brevard Hotel, where they are enjoying the warm sun for some months. Fred is retired from the Coast Guard service, so is free as he says, to watch the golfers and to fish right off the hotel piazza. He has not reported any catches as yet. Fred's home address is the Ontario Apartments, Washington, D.C.

Henry M. Loomis, now retired from the National Canners Association, cannot, however, seem to rest content; so he is putting in time helping to write a history of that association, with which he was identified for 25 years. It is expected that this history will be ready in conjunction with the 40th anniversary of the association, which will be celebrated in 1947.

Proctor L. Dougherty is still active as a consultant for some perplexed companies that require advice from time to time with problems connected with the Federal Government, at which his Washington experiences have made him something like an expert. His office is in the National Press Building.

Benjamin A. Howes, architect and engineer for the Federal Public Housing Administration, is still going strong. He is one of a committee of three that edits the *Federal Architect* and is a member of the board of directors. This magazine is noted for its high-grade articles and illustrations. Ben's son (M.I.T., '39) is with the Pratt and Whitney Engine Works, Hartford, Conn., where he is a specialist on heat interchange for airplane engines.

The sympathy of the members of the Class will go out to William C. Potter, former President and chairman of the board of the Guaranty Trust Company of New York, on the death of his wife, which occurred late in 1946 in New York City. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass.

1898

This '98 bunch is just like Aladdin's lamp. Rub it, and ask for anything, and there it is! Last month we asked for another Gulliver, and here he is — Charles Godbold, with a travelogue worthy of Burton Holmes. The travelogue is a letter describing an automobile trip from Washington to California, last summer. It is addressed to his live-wire friend, Proctor L. Dougherty '97 of Washington, whom again we are pleased to thank for his interest in our classmate and in '98. We will publish the travelogue in installments, as material is piling up on our desk. However, don't let this slow up any of you who are planning to write a letter for the '98 class notes. The pile will quickly disappear if not added to regularly.

Charles writes as follows: "When we parted after your visit with me at Cabin John, Md., in August, I promised to write and let you know of my travels and how we fared on the long trip. You remember

that at the time Mrs. Godbold was down with a minor rib fracture, which was not a very good condition to face for the journey. With plenty of pillows for padding, however, and not too excessively long runs, the rib not only gave us no trouble but improved to such an extent that instead of sticking to the originally planned short and direct route we diverted for a little adventuring. For there are still plenty of adventures awaiting the tourist as he gets away from the well-beaten trunk highways. Of course the word 'adventure' means a different thing to every age, and to our ages it might not be anything involving hairbreadth escapes. We all experience 'adventures in good eating' and also in 'good sleeping.'

"Our first stop was at Radford, Va., after passing down through Warrenton, Culpeper, Charlottesville, Lexington, and Roanoke, and we were able to get accommodations at the Governor Tyler Hotel, which is very pleasantly located on a hill overlooking the New River and far enough away from traffic to be quiet. Put this down in your address book as being a good place to stop. First day: 269 miles.

"The second night we stopped in Knoxville, Tenn., after a beautiful drive of 227 miles through southwestern Virginia and eastern Tennessee. Here we stayed at a tourist home, the best we could find, and it was a wonderful home. But it stood on the main highway through Knoxville, which carried a terrific amount of noisy traffic, the worst of it being the noisy street cars; and right here I want to say that nowhere in the United States that I have been do the streetcars compare with Ed Merrill's ('09) Washington fleet of cars. They are the best-looking, the quietest running, of any I have seen. Their color scheme is ideal, too, and void of any of the carnival red and yellow coloring met in other cities. I think I have read that there was a movement underway to jazz them up a bit, but don't let them change that outside color. My opinion was shared by a man I met in Tucumcari, N.M. He had lived in Washington and at one time had worked for the transit company. He had traveled 22,000 miles around the country and hadn't been in a city yet where the streetcars equaled those in Washington.

"After leaving Knoxville, we had the choice of going west on U.S. 70 to Nashville, and thence to Memphis, or continuing south to Chattanooga, and thence west on 64 to Memphis. Distances are about the same, but the latter route provides the better scenery and an opportunity to go up Lookout Mountain and get a view of the surrounding country. As we had been that way twice before, we aimed for the route through Nashville, but, as often happens on the road, we ran into a lot of road construction, and after we had gone over many miles of detours and studied our position, we found that our best course would be to run for U.S. 64, hitting it at Pulaski, where we tied up for the night, with a log of 245 miles for the day.

"From here to Memphis, 190 miles, which we drove the next day, the route is through the southern part of Tennessee, where the Tennessee Valley Authority has accomplished wonders in the distribution of light and power to the country homes. Even the most isolated cabins have wires leading

to them, and the people we talked with were very enthusiastic about the accomplishments of T.V.A. We crossed the Tennessee River on a toll bridge at Savannah, Tenn., and early in the afternoon arrived in Memphis. After inquiring at two tourist courts and finding no vacancies, we drove into town and picked out the best-looking tourist home we could find. Again it was a beautiful home, and our room was the original dining room, with the butler's pantry converted to a bathroom. 'Good eating' was obtained in a cafeteria about two miles away, reached after threading our way through the very heavy traffic usual in all cities at that time of day."

(to be continued)

Arthur and Jean Blanchard spent an evening with us before they drove south to winter at Lake Alfred Hotel, Lake Alfred, Fla. A card recently received says: "We are more than pleased with our winter quarters. Everything is just about perfect — weather beautiful, lots of flowers blooming, poinsettias, roses, Turk's-cap, hibiscus, and many others." Before leaving, Jean asked, "Are you going to have lots of nice times for us at the 50th?" How about it, '98?

Arthur, before leaving, brought in the class record books and archives. We have had much pleasure reading and looking through various booklets compiled after former reunions. We cull this gem from the Fifteen-Year Book: "Our Class President, and for 10 years efficient Class Secretary, now Professor and Curator C.-E.A., or — as he prefers to be called by '98, notwithstanding his titles and achievements — our Charlie Winslow writes: 'The class cup is on my desk and the good old Class is often in my thoughts and always in my heart.'"

About the 50th reunion — our energetic classmate, George Cottle, recently invited me to lunch with him at the Parker House to consider the difficulties of the situation. George is flying from Boston to Miami on December 31 for a month's vacation. He will not be far from the Blanchards and from Roger Babson's estate and Webber College. Happy vacation, George, and tell us all about it when you return.

If you have read George F. Willison's *Saints and Strangers*, you will recall one William Brewster, postmaster and owner of the great manor house at Scrooby, England, whilom student at Cambridge University and in the entourage of Sir William Davison, principal Secretary of State under Queen Elizabeth and a prominent factor in the founding of Plimoth Plantation in Plymouth, Mass., in 1620. If you have read through the various reunion booklets compiled by '98, you will have noted that one William Brewster of '98 is a lineal descendant of the distinguished elder and has many notable achievements to his own credit in this day and generation. Our Bill writes, from 2440 Kanawha Boulevard, East Charleston 1, W.Va., "I was glad to hear from you, and I should have answered long ago. You asked for some news. I enclose a clipping on my promotion to district engineer about six months ago. I cover about the same duties, looking after all Federal Aid in West Virginia, as heretofore, but with greater responsibility and more personnel. We have been building a rather large number

of roads, from forest trails to four-lane boulevards, and have had plenty to do. At present the lack of labor and materials has slowed up new construction somewhat. So much for business. Personally, I now have seven grandchildren, six girls and one boy. The last two are twins, one boy and one girl, named Hearon, now here with us and about nine months old. As usual, we are very proud of them. At the 50th anniversary, I hope to find all the boys, most of whom I haven't seen since graduation. I have really been too busy and too far away to attend previous reunions."

A smiling portrait of our genial-looking classmate and the following article entitled "Bill Brewster — Master Road Builder" from the publication, *West Virginia Engineer*, tells the story: "Behind the scenes of every public improvement program, there are the men in public service who visualize and plan our modern scenic highways of tomorrow. William Brewster, District Engineer of the United States Public Roads Administration, is one of these men. To most of us he is just plain 'Bill.' To him must go considerable credit for the excellent highway system existent today in West Virginia. When Bill Brewster came to West Virginia back in 1919, as Assistant to the Senior Engineer, the State was notorious for its poor roads. In many areas there was a complete absence of roads. In many parts of the state commodities were moved laboriously by mules and horses over the difficult mountain trails in much the same fashion as had our early forefathers. The railroads had slowly pushed their rails into the difficult terrain, and river barges poled slowly along the few navigable rivers. In a comparatively short number of years, West Virginia has developed a highway system which places them high in the nation's artery of roads.

"The fine discernment and ability shown by Mr. Brewster in his long tenure of public service stems from his colorful and interesting background. In 1898 he graduated from . . . Technology with B.S. and M.E. degrees. He began his business and professional career as a draftsman with the Otis Elevator Company in Boston. Then followed a period from 1901 to 1908 spent in Cuba. For two years he was engaged in the tobacco business and in 1903 Brewster accepted an opening in the Cuban Department of Public Works. After two years as First Assistant Engineer of Public Works, he joined up with a road contractor and supervised a number of construction projects at Havana and Pinar Del Rio, Cuba. Finally the longing to return home drew him back to the United States, and in 1910 Brewster entered the Highway Department of the Borough of Manhattan, N.Y. He remained in this position four years. In 1914 he accepted the Superintendency of bridge and road construction, with the E. H. Brown Co., operating in New Jersey and New York states. From 1917 until 1919 he was affiliated with the Gillespie Loading Company as a mechanical engineer. In the latter year, Mr. Brewster formed his association with the Bureau of Public Roads in West Virginia.

"Bill is a trustee of the Pilgrim Society, of Plymouth, Mass., a member of the Society of Mayflower Descendants, the American Society of Civil Engineers; the American Association of Engineers and the West

Virginia Society of Professional Engineers. He is a Mason, Shriner, and member of the Elks Lodge. The Brewsters have three children, William Jr., Walter Southgate and Mary Baylies (Mrs. Fanning Miles Hearon). Thanks for your letter and enclosure, Bill. Very sincere congratulations, and we'll be looking for you at the 50th.

We acknowledge receipt of an interesting letter from Roger Babson, of clippings concerning Donald Alexander and Earle Emery, and from the Alumni Office of a considerable list of changes in address — all of which will be elaborated later. We also acknowledge receipt of beautiful Christmas cards and greetings from Dan Edgerly, Charlie Hurter, and Edgar Weimer. Many thanks to these boys. Dan writes, "I am sending a picture of a New England winter to the Class Secretary." (This arrived but shortly before the recent ice storm! Did you send the storm, Dan?) Edgar writes, "I am still hoping to see you at our 50th reunion." Yea, verily, Edgar! So may it be! — EDWARD S. CHAPIN, Secretary, 114 Federal Street, Boston 10, Mass.

1899

Thomas Frank Lennan, V, or Tommy, as he was known to his friends, died on September 10 at his home in Joplin, Mo., of a cerebral hemorrhage. The *Joplin Globe*, in an editorial, said of him: "He was a bit of the courtesy and friendly culture of New England grafted into the newer, blunter order of the Middle West. . . . He was rugged but he wasn't rough, neither in his manner nor in his conversation, nor in his soul. . . . What a world it would be if all of us could be as courteous, as sincerely friendly, as buoyantly cheerful, as solidly efficient and energetic, as intrinsically decent, as kind of heart." Tommy went directly to Joplin on his graduation from Technology and directly into mining work. "Few of the veteran operators in the Tri-State field had as wide and as extensive mining career. . . . He never actively engaged in any other business." His wife, the former Charlotte Gregg, survives him. She is a daughter of a pioneer family of Joplin.

Frederick W. Grover, professor of electrical engineering at Union College in Schenectady, N.Y., since 1932, retired recently and is now devoting his spare time to editorial work for the Institute of Radio Engineers, to some consulting work, and to other activities of this general nature. After graduation, Grover spent the summer of 1899 at the Harvard College Observatory and then went to Wesleyan University as assistant in physics and astronomy. He received the degree of M.S. from Wesleyan in 1901. During 1901 and 1902, he was instructor in electrical engineering at Lafayette College. From there he went to the Bureau of Standards at Washington, D.C., as laboratory assistant and assistant physicist, his attention being centered on electrical measurements. He was granted the degree of Ph.D. by George Washington University in 1907. In 1907-1908, Grover studied at the Ludwig-Maximilians University in Germany, receiving the degree of Ph.D. from that institution. He then returned to the Bureau of Standards, this time as associate physicist. In 1911, he left to become professor of physics and head of

that department at Colby College, where he stayed for nine years. Then, in 1920, he joined the staff of Union College, where he has remained until his recent retirement. Grover is a fellow of the American Association for the Advancement of Science and of the American Physical Society and senior member of the Institute of Radio Engineers; he is a member of the American Institute of Electrical Engineers and of Sigma Xi. He is the author of many papers on electrical engineering and allied subjects.

Notice has only lately been received of the death of Winthrop R. Dodge, V, on November 22, 1945. No further details are at present available. — BURT R. RICKARDS, Secretary, 381 State Street, Albany, N.Y. ARTHUR H. BROWN, Assistant Secretary, 53 State Street, Boston 9, Mass.

1900

Part of a letter from Hapgood in Florida follows: "We took 12 days to drive down here from White Plains, N.Y., stopping at Williamsburg on the way. Williamsburg is well worth seeing. But all the riding, poor food, and exertion upset both Edith and me to such an extent that it took several weeks to get back on our feet again. I saw your class notes in the November Review. You don't suppose anyone would guess what we went out to purchase, do you? Let us have all the news."

Joe Draper said over the telephone from his office, where he spends a few hours each day, that he is leaving for Florida at the first of the year, for the season. He and Hapgood will have a great time with their feet in the hot sands. Since Allen also is about to go to Florida for the winter, no doubt we shall get a crate of oranges shortly.

Last November, Ed Bugbee came in and suggested that we take a ride to Taunton to see Wastcoat. We found him in bed, where he has been since June, but in good spirits and quite optimistic about getting around shortly. He sent his best to all classmates.

We regret to report the death on March 9 of Frederick W. Magdeburg, IV, in Virginia. — The *Boston Herald* carried the following notice from Reading, Mass.: "Frederick D. Ingalls, 69, of 1 Hopkins St., a consulting engineer, died [on November 17]. A graduate of . . . Technology in the class of 1900, he was one of the few life members of the American Society of Heating and Ventilating Engineers. He also was a member of the American Society of Mechanical Engineers and of all Masonic bodies, including Aleppo Temple, Boston. He leaves his wife, Mrs. Maud Gilbert Ingalls; a son, Gilbert of Reading; two brothers, Dr. Orlando Ingalls of Hurley, N.Y., and Wilson E. of Kingston, N.Y., and a sister, Miss Mary H. Ingalls of Kingston." The funeral services were held at his home, and Allen and the Secretary represented the Class. — C. BURTON CORTING, Secretary, 111 Devonshire Street, Boston 9, Mass.

1902

Plans for our 45th anniversary reunion are taking shape. The time is June 12 and 13 and the meeting place, East Bay Lodge, Osterville, Mass. It is hoped that as many as can will come early on Thursday, the 12th, and stay through until Saturday, the

14th, and adjourn to attend the Alumni Day celebration in Cambridge and the Alumni Banquet, at the Hotel Statler in Boston, in the evening. Members of the Class will be kept informed of the plans as they develop. Please save the dates and pass the word along.

A foretaste of the pleasure to be had at the reunion was experienced by the local group here in Boston a few days ago when Louis Cates came on to attend a meeting of the Corporation of the Institute and to give a talk before the local section of the American Institute of Mining and Metallurgical Engineers on December 2. Dan Patch kidnapped him as he was registering at the Ritz and took him down to the Tech luncheon club at Thompson's Spa. Those present besides Dan were Hunter, Jim Mahar, Grant Taylor, and Bob Williams. It was the first time Jim Mahar had attended any kind of an '02 function for years, but he enjoyed this so much that he resolved to be on hand for more of the luncheons.

A larger attendance was hoped for, but Lew Moore could not come, as he had an important meeting in connection with the heroic job he is doing to preserve the Boston City Club. Shedd's health prohibited his presence, as did that of Newell Page. Roger Greeley, Professor Porter, and Bill Bassett had hoped to be there but could not. Sawyer was to meet Cates later at the dinner at the Harvard Faculty Club. Both Sherman and your Secretary were out of town.

Two more members of our Class have passed away — Theodore G. Miller and William H. Matthies. Miller had been in poor health for some time and died on November 28 in San Antonio, where he had been resting on a large cattle ranch. An account taken from the *New York Times* of November 30 was sent in by Bill Kellogg, who writes: "Ted was not generally known to the Class, as he had to leave Tech suddenly at the beginning of his sophomore year because of his father's death. His path and mine have crossed frequently through the years, and personally I miss him very keenly."

The clipping reads as follows: "Theodore G. Miller, a former vice president of the American Telephone and Telegraph Company and a leading figure in the development of world-wide telephone communications, died . . . at the Santa Rosa Hospital in San Antonio, Tex. . . . His age was 66. Born in Sandusky, Ohio, Mr. Miller attended school in Cleveland and Boston and, after studying at . . . Technology, started his career in railroad construction work in Mexico. He joined the A. T. & T. in 1904 as a special agent in the general superintendent's office in New York. In 1915 as an 'outside man' on the extension of the transcontinental telephone line to San Francisco, he played an important part in bringing the job to a successful conclusion, tackling personally many of the difficult natural problems involved. In 1920 Mr. Miller returned here as general plant manager of long lines. The next year he had charge of the laying of the telephone cable to Cuba. Six years later he established telephone service between the United States and England over a radio telephone circuit from New York to London. The company will celebrate the twentieth anniversary of

this accomplishment next year. Subsequently the overseas service was extended to other countries and also to ships at sea.

"Mr. Miller, who became the department's general manager in 1924, was made divisional plant superintendent in Chicago in 1930 and promoted to vice president in charge of long lines. On April 26, 1935, once more in the New York office, he spoke to Walter S. Gifford, the company's president, in an adjoining room over a combination of wire and radiotelephone channels that circled the earth by way of London, Java and San Francisco. In 1940, Mr. Miller retired at his own request because of ill health. He was a member of the St. Anthony Club and the Sleepy Hollow Country Club. Surviving are a brother, Donald G. Miller of Mexico City, and two sisters, Miss Clara G. Miller of Summit, N.J., and Miss Merle G. Miller of Cincinnati."

Matthies died on October 20. He had for a long time been interested in the telephone industry, first with the Western Electric Company immediately after graduation, and in his later years with the Bell Telephone Laboratories. The following excerpt is from the *Bronx Home News*: "William H. Matthies, 67, who developed the first dial telephone exchanges in the U. S. and in principal European cities, died . . . in his home here. Prior to his retirement three years ago, he had directed circuit development for the Bell Telephone Laboratories, 463 Wall St., New York, for 25 years. Matthies first joined the Western Electric Co. 50 years ago. He left in 1898 to attend Cornell University. The following year he transferred to . . . Technology, from which he was graduated with a B.S. degree in electrical engineering in 1902. In 1903, Matthies rejoined Western Electric, and worked on the first dial exchange in this country at an experimental station in Queens. Under his leadership, the cross bar system of dial exchanges, now in use in New York, and the earlier panel system were developed. He was made chief engineer of Western Electric's Berlin, Germany, plant in 1905, where he established the first dial exchange. Five years later, Matthies was made assistant chief engineer for Western Electric in Europe, with headquarters in Antwerp, Belgium. Since 1918, Matthies was associated with the Bell Laboratories. He held 32 patents for circuit equipment used by Bell, and supervised the change from manual to dial systems in most larger cities. He was retired in 1943. Surviving are his wife, Mrs. Augusta F. Matthies, a son, Robert W. Matthies, and a daughter, Mrs. Louise Bellows." — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston 16, Mass.

1906

The Hartford, Conn., *Courant* of November 3, devoted a column to Robert J. Ross, III, on the occasion of his celebrating his 40th year of service in the engineering department of that city. Ross joined the department two years after graduation. He worked on a survey of the Connecticut-Massachusetts border and in private engineering before entering the city's employ. He was promoted to the position of assistant city engineer in 1911 and was made city engineer in 1937. In 1907, there were fewer than 10 miles of improved streets in the city, and many of the other streets had

not yet reached the "unimproved" status of macadam roads. Now, nearly 70 miles are improved with asphalt or concrete, and practically all streets have at least macadam paving. The department's force has expanded from 14 to 29 employees. The write-up quoted Ross as having said: "Planning for the future is a continuous job; since we never catch up with the future, the plans will never be completed." The future in the form of new ideas for traffic control, for housing improvements, for superhighways, and for parking developments cluttered most of Mr. Ross's office, according to the reporter. The past was represented by a neatly bound volume of the annual reports of the department of engineering for the past 40 years. In conclusion, Ross was quoted again, as follows: "But we have many plans for the future; Hartford is still growing and improving, and we feel it is our function as a service department to get the plans ready."

The Stoneham, Mass., *Press* of November 15, devoted a lengthy article to the E. L. Patch Laboratory, which is Stoneham's oldest manufacturing plant. This is of interest to classmates, as Ralph Patch is president and treasurer of this thriving industry. The business was started by Ralph's father, who was a pharmacist and was graduated from the Massachusetts College of Pharmacy in 1872. He later taught there but established the E. L. Patch Company in 1888 and remained as president and active head of the business until 1924, when he was succeeded by Ralph. The local papers emphasize that two outstanding factors in connection with this industry are the large percentage of Stoneham people employed and the large number of "Patchworkers" who have served the company for a period of 25 years or more. The concluding paragraph of the piece read as follows: "A recently augmented scientific research staff and a rapidly expanding sales force are indicative of increased production in the local plant in the days ahead and a further healthy growth of this important industry." We recently received Ralph's winter address, which is P.O. Box 266, Winter Park, Fla. Referring to winter addresses, Abe Sherman informs us that he is located at the Four Season Apartments, Lido Beach, Sarasota, Fla.

Tom Hinckley, who is in the taxation department of the State of Massachusetts here in Boston, has modestly submitted Service Bulletin No. 201 of the Tax Foundation. This bulletin includes a list of publications, among which is the following by Hinckley, Thomas L.: "Legislation Affecting Municipal Finances in Massachusetts — 1906-1945," April, 1946; 36 pages; 75 cents: Harvard Graduate School, Public Administration, Bureau of Research in Municipal Government, Cambridge, Mass. Tom should be congratulated upon his work as an author. For those of us who live in Massachusetts, he certainly selected a pertinent subject.

An address change is reported for Dr. Helen R. Hosmer, V, from Battle Harbor, Labrador, to Homestead Sanatorium, Middle Grove, N.Y.

The Secretary regrets to report the death of five members of the class as follows: Harry J. Armstrong passed away in 1945. Our last address, which was received in

1942, showed Armstrong to be a resident of Youngstown, Ohio, in recent years.

David D. Eames passed away on October 25. Eames was born in Framingham, Mass., and was graduated with us from the Mechanical Engineering Course. For a number of years he was with the Lockwood Greene Company, but for the last 10 years at least, he had been in business for himself as a consulting engineer. He was well known among the engineering profession of Boston and had worked with some of our classmates. Abe Sherman used to call on him frequently when he came to Boston. On learning of Dave's death, Abe dropped a note to the Secretary, a part of which read as follows: "It was a shock indeed to learn of Dave Eames's death. I think he had been in touch with almost none of the classmates throughout all these years, except that I have seen him in a business way more or less frequently for many years and have done quite a little business with him. I have always tried to get him to come to the annual dinners or the reunions, but he felt that he wouldn't know anyone there. The last time I saw him, about a month ago, I brought this up again, and he said that he might fool us sometime by turning up. Now, of course, it's too late. He knew Walter Clifford rather well in Tech, and it was quite gratifying, a few years ago, for him to be commissioned by Walter to lay out at least the heating system in the Clifford Manufacturing Company's new plant at Waltham; he also did some work for Walter at his plant in Allston. Incidentally, in both these cases he bought the boilers from us." He is survived by a widow, four sons, and three daughters. The Secretary represented the Class at the services, which were held in North Cambridge on Monday, October 28.

Perley K. Griffin, II, died at Abington, Mass., on November 8. He had been ill for some time. His last business connection was with the Bethlehem Shipbuilding Yard at Quincy, Mass. He had lived in Abington for five years, before that time residing in Arlington. He is survived by his wife, a married daughter, a son, and two grandchildren.

Thomas B. Holmes, III, died on August 28. Our record shows that he was with the American Graphite Company in New York but about 1925 moved to Keene, N.H., where he resided at the time of his death.

Russell P. Reynolds, III, died on August 30. The Secretary's record showed that he had been with the American Smelting and Refining Company as early as 1913 and as late as 1938. All this time he was located in Denver, Colo., where he resided when he passed away. — JAMES W. KIDDER, *Secretary*, 50 Oliver Street, Boston 10, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

1907

The funeral of James S. Rogers, who was affiliated with our Class during our freshman year in Course II, was held in the Baptist Church of North Conway, N.H., on October 18. He entered Technology from Governor Dummer Academy and after leaving the Institute took a course at the Harvard forestry school. He was prominent in North Conway town affairs for the past quarter century, having been a selectman,

a member of the school committee, a bank trustee, and active in Masonry and the Grange. His wife died in 1939, and there were no children.

Many years have passed since I have heard from André T. Kolatschewsky of our Class. An excerpt from a letter written to the Alumni Fund from Edgar P. Slack '08, follows: "I had a letter from Kolatschewsky the other day. He has been living in Antwerp these last 21 years and is in charge of the technical library of the Bell Telephone Manufacturing Company. Good old Kol — he says his hair is not so dark as it used to be."

A personal letter received from Charles R. Bragdon, 4 Rock Ridge Road, Larchmont, N.Y., last December reads in part as follows: "Our youngest daughter, Nancy Wayne (Smith, '39), was married in Dolgelly, Wales, on September 18 to Craig Parry Hughes of that town, and they are now living in Blackpool, England, where he is assistant solicitor for the 'corporation' (the city government). My wife and I were fortunately able to go over for the wedding, sailing on September 5 in the *Queen Mary* a half hour before the shipping strike began, and returning in the *Ile de France*, which brought us into New York on October 29, the day after it ended. I spent three weeks in London with our British associates, Ault and Wiborg, Ltd., after the festivities were over. Things are mighty tough over there — food, fuel, raw materials, clothes, everything; but they keep at it doggedly, glad that at least they are not dodging bombs any more. Our second daughter, Helen (Smith, '33), returned home about a year ago from her Wac service in the Pacific (New Guinea, Leyte, Manila) with a soldier's medal and is helping Smith raise its \$7,000,000 fund. Florence Elizabeth (Smith, '31) is Mrs. Alexander L. Abbott, living in Larchmont, and has a four-and-a-half-year-old daughter, Louise." — Laurence R. Davis, who is quarry superintendent of the Santa Cruz Portland Cement Company at Davenport, Calif., wrote me last November, mentioning the recent marriage of his oldest daughter, and his second daughter's graduation from the University of California last June. — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. HAROLD S. WYSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

From Paul: "I am continually twitted by the Farrar family, with whom I have made my home in Glen Ridge for 22 good years. For I come home from New York and tell them that I met So-and-So on the street. They say they never see a familiar face. Well, I like people, and I like to look at those I pass as I trudge the pavements of Manhattan. Twice recently, here in Glen Ridge, I have seen George Reppert, VI, who is listed as 1909 even though, like me, he spent at least two years in 1908. As I did for some 20 years, George rides daily as a commuter on the good old Delay, Linger & Wait, as the Lackawanna is often called. He is one of the lucky ones whose office is near the 23d Street ferry in Manhattan: he scorns the faithful subway to reach his office. For nearly all the 37 years since graduation, he has been with Otis Elevator

Company far over on the West Side along the Hudson River. George lives in Montclair and agrees with me that we have at the Institute the best college president extant."

We learned that Paul Lord, III, had been promoted to the position of general manager in the Mexican mining department of the American Smelting and Refining Company, and he will spend some months each year in New York at 120 Broadway. He writes: "Your kind letter of November 21 was forwarded to me from El Paso, and I shall be glad to give you a brief résumé of my work since leaving the Institute, particularly inasmuch as I enjoy very much reading in the class notes what other men are doing. From 1909 to 1916, I was with the Mexican mining department of the American Smelting and Refining Company, in Mexico. From 1916 to 1921, I was with the Phelps Dodge Corporation in Sonora, Mexico, and Bisbee and Morenci in Arizona. In the latter part of 1921, I returned to the American Smelting and Refining Company, going to Santa Barbara, Chihuahua, Mexico. Early in 1935, I moved up to the El Paso office of the company. Several months ago, my status was changed so that I shall be required to spend some months of each year here in New York, although I shall continue to live and make my headquarters in El Paso. In the years since I left the Institute, I have been associated with many Tech men, some who were graduated in the years preceding our Class, and many more, of course, who came out later. I was married in 1910, and Mrs. Lord and I have two married daughters — one living in Chicago and one here in New York — and three grandchildren. On these trips to New York, I am looking forward to renewing my acquaintance with 1909 men."

While at the Institute, Paul was an officer in Company D, was connected with "Technique" and was assistant business manager of *The Tech*. We congratulate Paul on his promotion, and classmates in New York will look forward to meeting him. — PAUL M. WISWALL, *Secretary*, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries*: MAURICE R. SCHARFF, 285 Madison Avenue, New York 17, N.Y.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

1911

Hats off again to our Class Vice-president, who for the third successive December has made a contribution to the Alumni Fund — "this very worth-while effort," as he describes it — that virtually doubles the 1911 total to date. The November 30 report showed that we had 131 subscribers (108 per cent of quota) and \$2,522.50 (90 per cent of quota); but along comes the Williams check, and we have 132 subscribers for \$5,022.50 (179 per cent of quota)!

Word has come from the Alumni Office of the death on October 26 of an active 1911 man, Isaac Hausman, I, who for many years had his own Hausman Steel Company in Toledo, Ohio. Born in Shepotavah, Russia, Ike came to America with his parents when a child, and the family settled in Marysville, Kansas, where he was graduated from the Marysville high school and attended the University of Kansas for two

years before joining us at the beginning of our sophomore year. He was particularly active in the Civil Engineering Society and the Cosmopolitan Club, having been secretary of the former group in his junior year and secretary-treasurer of the latter in his senior year, when he was also president of the Civil Engineering Society.

Another classmate, Conor Coppinger, a special student in our freshman and sophomore years, died in April, 1945, according to word received in November by the Alumni Office.

Our hearts go out to George Forristall in the sudden death of his wife, Renée, on December 14 at their recently completed new home at 46 Wall Street, Wellesley. She had but lately returned from a visit to her native France. Those of us who met her at the 35-year reunion were so charmed by her personality and vivacity that it seems hard to realize she is gone.

In early December a letter came from Ormond Bean, IV, an architect with offices in 721 Failing Building, Portland, Ore. In response to a request from me for information concerning himself, it is the type of letter that warms the cockles of a Class Secretary's heart. In addition to his own architectural practice, Ormond has been active in city affairs in Portland as well as in Oregon state affairs. He was city commissioner in the Portland department of public works from July, 1933, to June, 1939, and then public utilities commissioner of Oregon until June, 1943, when he went to Honolulu, Hawaii, as regional director for the Office of Defense Transportation until July, 1944, when he transferred his O.D.T. activities to Puerto Rico, where he was regional director, with headquarters at San Juan. From December, 1944, to March, 1946, he was with the State Department's auxiliary foreign service, assigned to the Cairo Legation as director of transport for the Middle East Supply Center, covering 15 Middle East countries, with headquarters at Cairo, Egypt, and considerable travel round about.

Of this latter assignment Ormond writes: "It was a very interesting experience and one on which I shall look back with a great deal of pleasure, for Mrs. Bean was with me and my duties required me to conduct myself more or less as a tourist through the countries which came within my jurisdiction. We spent 14 days in Teheran, Persia, two days in Bagdad, five days on the island of Cyprus, and three days in Beyrouth, motoring from there to Damascus, where we had two or three days on each of three visits. We traveled the length of Palestine eight times by car, air, and rail, stopping in Jerusalem four times for two to four days each time, in Amman, the capital of Trans-Jordan, for three days, and in Alexandria three times for three days each. We motored through Suez and 75 miles out to the center of the Sinai Peninsula and journeyed by rail up to Luxor, Karnak, and Aswan. We flew, however, from New York to Cairo, and did most of our trips in the Middle East by plane. My mileage for the three years was a little over 72,000, about 38,000 of it being by air. We returned from Cairo in the *Gripsholm*, by way of Salonika, Athens, Naples, Marseille, and New York; and after all this we have enjoyed being at home ever since."

Ormond is now in charge of sales and field operations for a Portland concern, the Prefabrication Engineering Company, "which plans to produce somewhere between 500 and 8,500 houses, depending on whether they can obtain a guaranteed market. If no guaranteed market is obtained," he adds, "they expect to put out somewhere around 500 or 600 houses in 1947. These are not of a temporary type but are substantial houses which have been approved by the Federal Housing Administration for guaranteed mortgage on a 25-year basis. The company is a branch of one of the largest lumber companies in the West." He also enclosed a "guest editorial" he wrote in early September for the *Oregon Journal*, Portland's morning paper, entitled "Palestine Background," at the conclusion of which he makes this statement: "The entire Middle East is uneasy under present conditions, and the final results may be of grave concern to the world as a whole."

Featuring the theme that "petroleum is progressive," the carefully planned public relations program to create a favorable impression of the oil industry was outlined to the mid-November convention of the American Petroleum Institute by Bob Haslam, X, Vice-president of the Standard Oil Company of New Jersey. Owing to Bob's illness, his paper was read for him. As head of a special A.P.I. committee that will direct the newly approved public education program, Bob pointed out that a public impressed with a realization of the industry's progressiveness will be inclined to think it should be left free from government interference; and this theme met the enthusiastic approval of a special forum on public relations held at the convention, in which public relations specialists and the trade press discussed the new project.

In the widely used newspaper column, "Ed Sullivan Says . . .," the following observations appeared as made by our own General Kenney, I, in a recent speech: "If, after more than a year, the two armed services can't tell the President what each of them is supposed to do in time of war, how can we say that we have the proper organization? What industry in our nation today has two boards of directors, two executive heads? . . . No sound planning, no sensible policy making, no consistent action is possible within the prevailing structure." George's persistency along this line was at last rewarded in mid-December, when the nation's military leaders announced a new setup, placing every area where American forces operate under a single, top commander, either of the Army or the Navy. Under this new setup the strategic air command, composed of strategic air forces not otherwise assigned, will also be responsible to the Joint Chiefs of Staff. This air command is in the hands of General Kenney.

Cal Eldred, VI, and his wife have moved from Dedham to 22 Halford Road, West Roxbury 32, Mass. He is still mechanical superintendent for Hollingsworth and Vose, East Walpole paper manufacturers, and reports that "the news is a grandson, born on April 6 — Calvin Powell Eldred. The maternal grandparents are Howard Fessenden '13 and his wife of Newton Center." — All officers of the Marlboro, Mass., Chamber of Commerce were re-

elected at the annual meeting on December 9, including Johnnie Bigelow, IV, as secretary-treasurer. — At this mid-December writing, we learn that Dick Gould, XI, director of the division of engineering and architecture for the City of New York, will be the featured speaker at a joint meeting of the civil and sanitary sections of the Boston Society of Civil Engineers on December 18, describing "Sewage Disposal in the City of New York."

On Thanksgiving morning, while in Worcester, I called to see Carl Barnes, VI, at a new address, as reported in last month's notes, and found he had been employed by the Riley Stoker Company but hadn't lived at 10 Lagrange Street for some time. From Fred Daniels, VI, President of Riley Stoker, I learned that Carl had worked for them for but five months and left on April 26, giving his address as care of R. Gilmore, Route 1, Geneva, N.Y. Quipped Fred: "It looks as though he left here to go back on the farm."

In conclusion, please reread Paragraph 5, Sentence 2, and then "write to Dennie!" — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

1914

Another month passes, and again it becomes your Secretary's sad duty to record here the deaths of two more of our classmates. Harold Watson Nightingale died at Seattle, Wash., on October 20. Nightingale came to the Institute from the Malden, Mass., high school and was graduated from Course VII (Biology). His first position was as a sanitary engineer in the Panama Canal Zone, leaving to enter World War I as a lieutenant. After the war, Nightingale became an instructor at the University of Washington and then for eight years served as state sanitary engineer for the Washington state board of health. In more recent years he had been consultant for Rayonier, Inc., and Crown Zellerbach Corporation. Nightingale is survived by his widow and a son.

This fall William Henry Price and Mrs. Price went to St. Augustine, Fla., for a vacation. There, on November 21, Bill was seized with a heart attack and died. Bill came to the Institute from Chicago, where he was prepared at Lewis Institute. He was active in a variety of undergraduate affairs, being assistant publicity manager, and later treasurer, of Tech Show. In the field of athletics, he was a member of the freshman and sophomore baseball teams as well as playing on the class basketball team during his sophomore and junior years. He was a member of Delta Tau Delta. Although a chemical engineer, his lifework was principally concerned with mechanical engineering, especially in sales promotion work. During World War I, however, he was associated with Walt Keith and Bert Hale at the Goodyear Tire and Rubber Company at Akron in the development of gas masks. At the time of his death, Bill made his home in Chicago and is survived by his widow, a son, and a daughter.

On December 5, at the Technology Club in New York City, Charlie Fiske ran one of his famous 1914 dinners. These events have become so popular that it has been decided to make them an annual affair. As

many organizations meet in New York during the first week in December, this would seem to be a good time for our dinners so that many out-of-towners can be present. Those attending this year from outside of greater New York were Jim Reber from Auburn, N.Y., Roy Parsell from New Haven, Ralph Perry from Torrington, Conn., Art Peaslee from Hartford, Peb Stone from Bridgeport, Atwood, Crocker, and your Secretary from Boston. Norm MacLeod from Providence was in New York and had planned to attend, but on the day of the dinner he was elected a director of the National Association of Manufacturers and was unable to break away from a meeting there in time. Chatfield and Whitwell had both planned to come into New York but at the last minute had to call it off (page J. L. Lewis). In addition to the out-of-town men, others attending were Affel, Aldrich, Crankshaw, Dickson, Gould, Isaacs, Ober, Owen, Perley, Spitz, Mudge, Mayo, Admiral Richey, Barratt, Russell, MacCart, O. C. Hall, and of course Charlie Fiske, who arranged the party.

Lin Faunce had expected to attend but was unable to make the dinner. He had previously written that his son Jack was now out of the Navy and was in the insurance business at Cleveland, Ohio. His daughter Nancy has recently married and is living in Hartford, Conn. — Doc Root wrote that he would be unable to come to the dinner but that he is still a practicing physician. His three sons have all been in the service; one is still in the Army; one is now discharged from the Army after serving in the Philippine campaign; and one was recently discharged from the Navy after long service. His daughter is a nurse. — A conflict of dates prevented Frank Somerby from attending. He is still very active in secondary school education in New York City. In addition to being on the faculty of Buckley School, he is active in school association work.

Gilbert Wagner writes that after four war years at the Pratt and Whitney Aircraft Company in their engineering departments at East Hartford and Willimantic, he has returned to Stafford, Conn., and re-established his former contracting business. He does not, however, mention whether or not this includes his former side line of selling and installing lightning rods.

After serving five years, five months, and five days, Ralph D. Salisbury, a lieutenant colonel, is back in Ohio. For a short while, he was resident engineer on the Delaware-Ohio flood-control dam project; then he shifted to his present position in the construction section of the Veterans Administration. Although his headquarters are at Columbus, Ohio, his activities cover the states of Michigan, Ohio, and Kentucky.

Alumni Day at M.I.T. will be on Saturday, June 14. — HAROLD B. RICHMOND, *Secretary*, General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York 19, N.Y.

1915

Eight hundred and eighty-five dollars! Frances and I thank you all very much for this splendid wedding gift. To Virginia and Barbara Thomas, to the big committee headed by these two gracious ladies, and to

the 90 classmates who contributed to this wonderful gift, goes our deep appreciation for your generous and kind spirit. Frances and I are overwhelmed — many thanks, many blessings.

At a class dinner including wives and held at Walker Memorial on December 5, Barbara and Virginia Thomas presiding at the head table presented us with your check. George Rooney introduced Frank Kanaly, our old freshman gym coach, who reminisced a little about the Garrison Street days. After all these years, it was good to see Frank again unchanged by time and as rugged-looking as ever. After one of Bert Bridges' enjoyable dinners, Sam Eisenberg, in his inimitable way, presented Bert Adams, who entertained and mystified us with his usual delightful demonstration that his hands are faster than our eyes. With new tricks in his repertory he had us all on the edge of our chairs. Bert is always generous and gracious about giving these shows for our Class.

Henry Sheils's daughters, Marjorie and Theresa, with Johnnie O'Brien's daughters, Loretta and Alice, as "The Musical Nymphs," furnished lively music for the evening. The following wires from absentees typify the gay spirit of the entire party. From Louie Young in Pittsburgh: "I'm sorry I cannot be with you tonight. If the Class can be of any assistance in making Azel a model husband, you may be assured that I will back such a movement with every effort. I still reserve the right to kiss the bride at my first meeting." Knowing Louie's proclivities, I'll need the approval of the Class for this permission, which is saying politely what I'd really like to say.

From Speed Swift in New London, N.H.: "Greetings and best wishes to Frannie and Azel. Sorry I cannot be present as I should like to take movies of you two for the future generation." In answer to this, I can only remind you of Speed's famous artistic movie, "Help Azel." From Harold Colby: "We regret our inability to attend class dinner and reception. Please extend to Azel and his bride, my wife Madelaine's and my congratulations and best wishes for continued happiness. Remember me to all the boys." From Tower Piza in New York: "Heartly congratulations and fond best wishes to Azel and Frances for lifelong happiness."

The following 58 were present: Bert and Helen Adams, Bill and Marjorie Brackett, Bill Campbell, George and Eileen Collins, Gene and Shirley Eisenberg, Sam and Ida Eisenberg, Fanny Freeman, Louie and Sadie Gale, Abe and Haya Hamburg, Loring and Ruth Hayward, Clarence and Evelyn Hausen, Frank Kanaly, Clive and Mona Lacy, Anne K. McCarthy, Marjorie (Sheils) Maher, Archie Morrison, George and May Moulton, Pete Munn, Frank Murphy, Alice O'Brien, Johnny O'Brien, Loretta O'Brien, Wally and Ardell Pike, Gene and Ruth Place, George and Ethel Rooney, Frank and Mary Scully, Henry and May Sheils, Teresa A. Sheils, Jac Sindler, Ed Sullivan and his sister, Barbara and Virginia Thomas, Jim and Anne Toura, Fred Waters, Easty Weaver, Max and Catherine Woythaler, and Frances and I. Many chaps who could not come to the dinner sent congratulations on their return postals. It was a gay and happy evening for us, and we hope for all.

On November 9, Phil Alger was mar-

ried to Helen Jackson Hubbell in Bedford Village, N.Y. Congratulations and fond wishes to Phil and Mrs. Alger and all our best to them. An early notice in the New Haven, Conn., *Journal-Courier* says: "Announcement is made by Mrs. William N. Hubbell of this city and of Quincy, N.H., of the engagement of her daughter, Miss Helen Jackson Hubbell, to Philip Langdon Alger of Schenectady, N.Y., son of Mrs. Philip R. Alger of Annapolis, Md., and the late Capt. Philip R. Alger, USN. Miss Hubbell's father was the late Rev. William N. Hubbell of New York. An associate professor of chemistry and nutrition in the Yale School of Nursing, Miss Hubbell was graduated from Teacher's College, Columbia University in 1917. She received her M.S. degree in 1928 and her Ph.D. degree in 1936, both from Columbia. During the years 1928-31 she was extension assistant professor of home economics in the New York State College of Home Economics, Cornell University. Mr. Alger is staff assistant to the manager of engineering, apparatus department of the General Electric Company and a director of the American Institute of Electrical Engineers. He was graduated from St. John's College, Annapolis, Md., in 1912 and from . . . Technology in 1915. He received an M.S. degree from Union College in 1929. From 1917-19, Mr. Alger served as lieutenant, Ordnance Department USA, and later was major in the USR. . . ."

As editor of "Scalars," the official publication of the Southern California section of the American Chemical Society, Ken Kahn writes: "You are no doubt being showered with congratulatory letters. Please add my best wishes, too. It is nice to know that you are now safely tied down and ready to become domesticated. I hope your new duties will not take too much time from your activities as Class Secretary because no class ever had so good a secretary, and no one can ever take your place. George Cunningham '27, H. E. Beebe '10, and I went over this afternoon to the inauguration of Dr. du Bridge as president of the California Institute of Technology. We saw and heard Dr. Compton deliver a masterful address, and of course several other M.I.T. men were among the notables. At the reception following the inauguration, we had a nice chat with Dr. Compton. It surely was a pleasure to see him. I was sorry that there weren't any other '15 men there, but we are having one of our hard winter rains, and at such times most people stay indoors. I thought you might be interested in knowing that some of us were there." He sent an attractive booklet, published by the M.I.T. Club of Southern California, which lists 22 members of 1915 as living in California.

Bert Adams joins the grandfathers with the birth of Glenn Adams March on September 29. The mother is Bert's daughter Peggy, the father Eugene A. March '41. Another daughter, Jane, is married to George Toumanoff '42. Bert believes in keeping his sons-in-law in the Technology family.

Don and Dot Perin of 29 Shattuck Street, Greenfield, Mass., write as follows: "Congratulations! We hear you are going to be married, and send the very best of good wishes, good luck, and happiness. Besides the illness that Don has, he turned over in

bed and in some way broke his right arm in a compound fracture almost three weeks ago. He was very upset to think he couldn't attend the class reunion. He is all in favor of the Boston Tech Club. Right now he cannot get out of bed, but we do plan to go to Boston as soon as he gets better. A five-year siege of illnesses, all serious, isn't much fun. Do you remember John Janson? He went to Tech, and we all lived over in Erving for several months. We had lots of fun while it lasted. Don was redesigning the machinery but of course overdid. John had a nervous breakdown. You have been so very kind to keep in touch with Don, and we want to thank you and let you know that it is only serious illness that has kept him from co-operating with your plans. We are staying with my family in Greenfield at present until he recuperates. I wish I could get him up to the Mary Hitchcock Memorial Hospital in Hanover, N.H., where he was operated on. He has been back for treatments several times but at present cannot leave his bed. This is only a note, but we wanted you to know how things are, and how much we appreciate your notices, and notes." We send our sympathy to Don and Dot with best wishes for his speedy and complete recovery.

After the Boston dinner, Gene Place wrote: "Ruth and I both enjoyed being there with our classmates and their wives. We also enjoyed your speech and were sorry that it all couldn't continue for a long time. There is certainly a spirit among Technology graduates in the Class of 1915 that can't be beat." Gene is one of the '15 men who takes substantial measures to make our famous spirit unbeatable. At Frank Scully's office Christmas party at the Scully Signal Company, there was a small 1915 reunion consisting of Frank, Loring Hall, George Rooney, Jac Sindler, and myself; at Sam Eisenberg's office party, Sam, Henry Sheils, George Rooney, and myself — a hectic holiday period.

It's a pleasure to report that San Willis is now feeling better and has moved East to recuperate at his daughter's place in Marshfield, Mass. Shortly before that, Mrs. Willis wrote Barbara as follows: "This morning a bulletin arrived telling of the splendid plan to give Azel Mack a 'worth-while' wedding gift. Sanford would feel very unhappy if he weren't a part of this plan. Undoubtedly you know Sanford is seriously ill at St. John's Hospital here. He was stricken two weeks ago today with a heart attack — a coronary thrombosis to be exact. For several days we were given no hope — the children all came on. However, Sanford's will to live is strong, and he may pull through this; but the future must be one of extreme quiet and rest. That isn't going to be easy for him, I know. After a long siege in the hospital, if all goes well, I shall get him back East, where we can stay with Peggy in Marshfield for a while. I doubt that Sanford will be able to resume his work here, and we are both homesick for the East. We are still having special nurses. Our very best wishes for happiness to Azel."

After 30 years of silence from 925 Amherst Street, Buffalo, N.Y., Ben Lapp comes to life: "Receiving the pleasant news of your marriage was a sufficient shock to arouse me from my lethargy. I had given up on you long ago, which made the sur-

prise all the greater. I'm really very glad, however, and send our best felicitations to you and your wife. I haven't written or heard from you in a long time (it's not altogether your fault), and so I'm out of step with your recent activities. Where are you located now, and what else is new with you? Things have moved right along with us, and we're still at the same old stamping grounds, busier than ever in the face of mounting material shortages and a much tougher labor field. I became a grandfather last spring (Soph automatically became a grandmother simultaneously) when Evelyn had a boy. Evy and my son-in-law, Bob, are living at Hamilton, N.Y., where Bob teaches economics at Colgate. Marshall is attending high school, having been graduated from grammar school last summer. He seems to be doing very well and is getting set for a career at M.I.T. I may call on your good services for a boost when he's ready to go. I haven't been in Boston for some time, but will look you up next time I go home. Soph mailed a parcel to you both this week, so let us know whether you've received it. Give my regards to the boys (who have probably forgotten me) and again, the best of luck to your wife and yourself. Let's hear from you." I was glad to hear from you, Ben. Thanks for the gift, and we hope to see you soon.

With the gifts for the wedding fund, Barbara received many newsy letters, some of which follow, leaving more for next month. From Tom Huff, Management and Research, Inc., Primos, Pa.: "I want to take this opportunity to congratulate both you and Miss Clarke on your marriage and wish you every happiness. We sincerely hope that when you come to Philadelphia you will let us know in order that we may have the pleasure of returning the hospitality you extended me in Boston. I tried to reach you the other morning in Boston while passing through on the way to Portland, but you had already left the apartment." From Funny Man, Burr Swain, 90 Evergreen Place, East Orange, N.J.: "Congratulations, good wishes, and many years of happiness — I do hope that your new state of being will not stop those bright spots in the winter when you and your gang came on and broke up the routine."

From Frank Murphy, 45 Virginia Road, Quincy, Mass.: "With my subscription for Azel Mack go my best wishes for Azel and his bride-to-be." From Ken King, Du Pont Building, Wilmington, Del.: "I am enclosing a check for the present for Azel Mack. Please give the newlyweds my very best wishes." From modest Jim Tobey, 840 Forest Avenue, Rye, N.Y.: "So Azel has fallen off the bachelor wagon at last, the old reprobate! Now he will be a long time catching up with some of us venerable grandparents. But the best of luck to him. I am, of course, glad to enclose a contribution to the festivities, though we war veterans are poor men. About all we have gotten since we came back is welcome signs, which the boys can't eat or live in. I suppose your mornings are fully occupied, but if you tune in on the Yankee network some Monday, Wednesday, or Friday at 9:30 A.M., you will have the inestimable pleasure of hearing a really good radio program. It's mine."

From Charlie Williams, Old Stone House, Spuyten Duyvil, New York, who cer-

tainly did not give me much of a chance (but I fooled him, eh!): "I enclose my check for the 'help Mr. and Mrs. Azel' fund. It's a grand idea, but this is one wedding gift I never expected to be able to help pay for." From Louie Young, Gillette Safety Razor Company, South Boston: "Best regards! Here's hoping we get a good collection for Azel." Louie, it was a *swell* collection. From Andie Wardle, 10 West Elm Street, Chicago 10, Ill.: "Will you please extend for me congratulations and felicitations to that peer of class secretaries and a grand guy, Azel! We have not managed to get back East since last we saw you in 1941, but 1947 may be the year — we hope." From Doug McMurtrie, Bellevue Place, Gorham, N.H.: "In response to a recent letter from a large committee of the Class of 1915, I'm enclosing a gift to be added to the many others for Azel Mack. I hope you will give him the collective congratulations of the out-of-town members."

From John S. Little, 50 Canterbury Lane, Westfield, N.J.: "With my gift I send much appreciation of Azel's work for 1915. I wish him all the luck there is in his new venture." Ernie Loveland has a new address, 1949 East 93d Street, Cleveland, Ohio. From Clive Lacy, 261 Nahanton Street, Newton Center, Mass.: "Enclosed is my contribution to the wedding present for Azel. Thank you for your efforts on this job." From Alfred Hall, 19 Locke Street, Saco, Maine: "The announcement of Azel's marriage was certainly a surprise. I've always regarded him as a confirmed bachelor. Clubbing together and giving him a present from the Class is a fine idea, and I am sending my check." From Wink Howlett, 22 Scarsdale Road, Newtonville 60, Mass.: "I hope I'm not too late with the check for Azel. Why don't you call us up some night? Both Kath and I would love to see you and your lovely daughter."

From Ken Johnson, 2 Beech Drive, Norwich, Conn.: "In reply to your letter about Azel's 'stepping off the deep end' on October 25, I send the enclosed contribution." From John S. Gallagher, 1037 Burnside Avenue, Los Angeles 35, Calif.: "It gives me great pleasure to acknowledge a debt to my old classmate, Azel." From Henry Daley, 3001 Walnut Street, Philadelphia 4, Pa.: "I am happy to enclose a check for the Azel Mack gift fund. Azel is such a swell chap, I know you will receive a generous response from the Class." From George Easter, 2434 South Avenue, Niagara Falls, N.Y.: "Best wishes to Azel and the new Mrs. Mack." From Fred Cook, 63 Buckingham Place, Lynbrook, N.Y.: "Enclosed is my check for our wedding gift to Azel. If you ever see Fanny Freeman, please remember me to him." From Orton Camp, Waterbury 30, Conn.: "I am glad to enclose a check toward the wedding present for Azel. I hope you do get a big response from the Class." From Loring Hayward, 18 Crocker Building, Taunton, Mass.: "Azel told me at our class reunion that he didn't want anything for a wedding present except cash money. Therefore, I hope that the committee will get him a bushel basket and fill it with small change." Loring, that \$885 looks more like a ton than a bushel.

From Henry Sheils: "My bit for a gift for that old goat, A. I don't know just what we'd do if we couldn't call on you, Barbara. I guess there wouldn't be any class."

From Harry Murphy, Massachusetts Engineering Company, Inc., North Quincy 71, Mass.: "Like Achilles, it appears that Azel does have a vulnerable spot after all. To him and his bride-to-be my best wishes. It truly is a pleasure to 'help Azel.'" From Otto Hiebert, 262 Cedar Street, Corning, N.Y.: "Please add the enclosed to 'help Azel.'" From Ed Sullivan, 564 Fifth Street, South Boston: "It slipped my mind until now to contribute to that collection for the deserving old couple, and I hope I am not too late. I would suggest that you buy something that would keep them warm in their old age, such as hot-water bottles, wool blankets, and so on. You know that when youth leaves we turn to artificial heat to keep away rheumatic pains. Best regards and hope to see you at the next meeting, as I understand it is to be ladies' night." These letters were all addressed to Barbara Thomas, who got a big boot from the personal messages included from so many of her old 1915 friends. Incidentally, Barbara did a monumental and very creditable job in censoring and editing all these letters so that they were turned over to me ready for inclusion in the class notes.

It's sad to have Henry Daley's message of the passing of another classmate, Orie L. Hall, IV: "Once again, it becomes necessary to inform you of the passing of one of our classmates, Orie L. Hall, IV, from a heart attack on Friday, November 29, in Chicago. Orie had not been in good health for the last year or more — in fact, had to lay off for several months after his first illness. He had been with the B. F. Sturtevant Company since graduation from Technology — about 10 years at Hyde Park and for the past 21 years in our Chicago office as industrial sales engineer. I had lost personal contact with him since he went to Chicago, except for occasional exchange of interoffice communications. He is survived by his wife, one son, and two daughters, also two grandchildren."

In addition to your generous check, we've received several attractive gifts from individual classmates which will enhance the welcome at our apartment for all of you. A graduate of the Garland School in Boston, Fran is a good cook and joins me in cordially inviting any of you who get to Boston to come out for dinner. At least spend an evening with us and see what you've done to "help Azel." — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.

1916

Since it is necessary these days to have a clearly defined policy respecting everything, your Secretaries have decided to adopt "Speak for yourself, *please*" as theirs. In that way a personal report from each member will appear (we hope). We should appreciate it if you could bring yourself to write to us first — if it is only a postal card to let us know how and where you are.

For example, Barney Gordon comes forth with this brief but welcome information: "I am still tending my knitting, and I notice that you are still hammering away at your granite"; he adds, "When in Boston call COMMONwealth 3507."

Joel Connolly sends the following: "I have recently had the pleasure of seeing Aimé Cousineau, commissioner of city

planning in Montreal, and Howard Green, Secretary of the Cleveland Health Council, at the meeting of the American Public Health Association in Cleveland. Both were looking well and Howard was doing an excellent job seeing that everyone who came to Cleveland was given every possible attention. In response to your inquiry about me, I am rounding out 21 years in the Chicago health department, where at the present time I am the assistant to the president of the board of health, and find the work extremely interesting — never a dull moment. The honor of being chairman of the Public Health Engineers' Club of Chicago has been given to me. I have a wife and two children; the older of the two, Ruth, is in her freshman year at Carleton College, Northfield, Minn., the younger one, Joel, Jr., is in the sophomore class in the North Park Academy in Chicago. I was sorry I did not get to our Class reunion last June on Cape Cod, although I did spend my vacation at Brewster, Mass., a little later in the summer. Why don't you have our next reunion in Chicago and give our members in the West and Middle West a better opportunity to attend?"

A letter from Bruce Clarke runs as follows: "Your question as to what I have been doing the last five years leaves me wondering. There was a war, as I recall; anyway the Bell Telephone Laboratories put me under lock and key shortly after hostilities began. I was in a group publishing government manuals for the installation, maintenance, and operation of radars, sonars, fire controls, battle announcing systems, and the like. The statisticians say our group published over 400 manuals in one year. Anyway, if I never see another manual, it still will be much too soon. My son, Robert, like the rest of his Class of '44, was in and out of Army camps and O.C.S., and spent 18 months in New Guinea and the Philippines. He returned to the Institute this fall to pick up the pieces. I am now in the process of doing the same at the laboratories; trying to help the publication department catch up on the backlog of things held up for security reasons, or because all possible man power was being applied to war projects. In short, we are now reconverting for the Atomic Age — whatever that may be."

As a result of a secretarial request, Joe Barker forwarded some information which, concluding it was too lengthy, he asked that we edit, if space limits required consideration: "After a year and a half as acting president, I acceded to the request of my fellow directors of the Research Corporation to become president and devote my full time to the business and foundational work of the corporation. My resignation from the deanship of engineering at Columbia was accepted by the trustees as effective on April 1. The Research Corporation, of which I have been a director for some 15 years, has its primary business in the manufacture, sale, and installation of Cottrell Electric Precipitators, the basic patent for this process having been given to the corporation in 1912 by the inventor, Frederick Gardner Cottrell (whose portrait hangs in the second-floor lobby of Building 10 at the Institute). The corporation is a nonprofit organization in that all the net income of its operations is reserved for educational and scientific grants, there be-

ing no stockholders. A second aspect of the corporation's business activities is the management of patents assigned to it for administration by educational institutions as a result of research done by the staffs of these institutions. M.I.T. was the pioneer in establishing such relationships with the Research Corporation. In addition, it has accepted some patents from individuals and groups not directly connected with educational institutions when the inventors desired to dedicate a major portion of the royalties to the objectives of the Research Corporation — grants for scientific research in our educational institutions.

"It was this intriguing variety of work which induced me to leave engineering education, and I find even greater inspiration therein than I had anticipated. You ask about the family also. We are now living at 45 Beechmont Drive in New Rochelle, N.Y. My daughter, Beatrice, is married to a Tech man, Sidney L. Hall '43, and living now in Concord, N.H., where Sidney is employed with Textron, Inc., after serving as a flight officer in the Army Air Forces. They have a prospective M.I.T. student in their son, Leigh Spaulding Hall, 2d, since both the grandfathers and the father are M.I.T. men. My son, John, is now attending Sampson College, after completing two years of service in the Navy. My stepson, Michael, is at home with us attending Iona School in New Rochelle. His intense interest in playing football is making him waver at this time between Notre Dame and M.I.T. as prospective colleges."

Sandy Claussen must be a good executive, for he replied very promptly, and interestingly, to a request for a little news. Here's what he says: "I have your letter of November 12. More power to you in your efforts to keep the 1916 column in the Review active! I feel reluctant to write about myself when there are so many other 1916 men in the Bemis Brothers Bag Company (not to overlook possibly 50 other M.I.T. men scattered around in our 26 plants in various parts of the country). The 1916 list, I think complete, includes Chuck Loomis, XI, Tom Little, I, Dick Hunne-man, II, John Phillips, V, and myself, II. Chuck is manager of our Memphis plant, Tom is treasurer of Bemis. I little dreamed, when we Course II men were studying cotton mill machinery in second-year "Mechanism of Machines," that I should some day be directing the operations of four cotton mills and a textile finishing plant. As vice-president of the Bemis Company, that, in brief, is my job.

"Recently, I was elected vice-president of the Cotton-Textile Institute, Inc. This is somewhat comparable to the American Petroleum Institute, the Iron and Steel Institute, and other similar national institutions. Incidentally, I noticed in the *Journal of Commerce* for November 18 that our classmate, Robert E. Wilson, chairman of the Standard Oil Company of Indiana, was elected vice-president of the American Petroleum Institute at their 26th annual convention in Chicago. Congratulations, Bob! During the war, I took many trips to Washington as a member of various O.P.A. and W.P.B. industry advisory committees. Although I live in Wellesley Hills and my headquarters are in Boston, I find it necessary to be on the rails about half the time, especially to New York City, the Midwest,

and the South. This is not my idea of living! I am pushing 53 and have been looking ahead to that period of life when it would be possible to take things easier — enjoy life and leisure more — but it has not worked out that way. Company and industry demands requiring travel, conferences, hearings, and speaking seem to grow increasingly heavy.

"Last summer, I fulfilled a long desire to take an offshore cruise which carried us around parts of the New England Coast and gave me some deep-water experience and an even greater longing to repeat. We had a 32-foot cabin cruiser, sleeping four, fully equipped for comfortable living, although slightly wet inboard under heavy going. For a crew, I had three husky kids, including my older son, Gifford, who is 15 years, 190 pounds, six feet, three inches, and headed for Tech in 1948. These are the recent highlights. . . ."

Howard Hands continues to call Wellesley Hills his home; his son, Richard, is a sophomore at the Institute. According to latest reports he no longer rolls Edgeworth cigarettes with those brown wheat-straw papers. He says that, in October, Murray Graff was in the East on a trip from Denver, where he is connected with the General Electric Company. — RALPH A. FLETCHER, Secretary, P. O. Box 71, West Chelmsford, Mass. HAROLD F. DODGE, Assistant Secretary, Bell Telephone Laboratories, 463 West Street, New York 14, N.Y.

1917

We note that two of our members have taken on new responsibilities within the companies with which they are associated. Cornelius C. Coakley has recently been appointed plant manager of the National Aniline Division of Allied Chemical and Dye Corporation. A native of Brooklyn, he started with the company at Marcus Hook in 1917 and went to Buffalo in 1923. He has been area supervisor of operations and assistant plant manager in charge of engineering, constructions, maintenance, and power. Evan R. Wheeler is now acting general purchasing agent of Western Union Telegraph Company. He entered the company's engineering department in 1917 and participated in the improvement and development of ocean cable equipment, telegraph ticker systems and landline automatic telegraph equipment.

Major General Hegenberger has been appointed commanding general of the Pacific Air Command. All his family have not joined him in Okinawa, however — his daughter, Geraldine, was recently married in Los Angeles. — Clarence Holt reports that his new venture of offering a special guest service at Keene worked out as satisfactorily as he expected this summer, and that he plans to expand operations next year. Until April first, he and Mrs. Holt will be at 612 23d Avenue North, St. Petersburg, Fla.

The turn of the year brings the time of our 30th reunion even closer. We hope that as many as possible of the Class will join both New Englanders and those from distant points at Wentworth-by-the-Sea in Portsmouth, N.H., in early June. — RAYMOND STEVENS, Secretary, 30 Memorial Drive, Cambridge 42, Mass. PHILIP E. HULBURD, Assistant Secretary, Phillips Exeter Academy, Exeter, N.H.

1918

This is a season of the year when the farmer traditionally sits beside his kitchen stove with the tranquillity of a contented cow, and reflects upon the snow silently delivering nitrogen to his hungry soil. As farming cannot be successfully pursued without fertilizer, so class notes cannot be consistently ground out without grist. But away with these people who say, "Now fellows, if you don't write me, I'll have to chew the end of my pencil, so hurry up with contributions." Grist should not be exhorting, or spooned out, or excavated with the eager, undismayed approach of a gravedigger. It should be brought to life with the cheerful bedside manner of a physician in the delivery room. This month it is to be quadruplets, whose news was born in the following order.

On December 1 a post card from Orville B. Denison — that gifted troubadour of 1911, that great and good friend of all M.I.T. men, that perennial entertainer at Freshman Camp — conveyed the news that our own William Chapman Foster was appointed undersecretary of commerce by President Truman on November 29. The only thing we resented, but record here nonetheless with the imperturbability of a gargoye, is the Associated Press's calling Bill a "small business man from Long Island." Looking at the phrase from the northeast, Bill must weigh 200 pounds (rubsides wt.) if he weighs an ounce; and looking at the phrase from the south, Bill is president of the Pressed and Welded Steel Products Company. Whence this naïve assumption that Bill is a small businessman? He was an aviator in World War I. We knew he would fly high.

The second baby in this month's class notes is Albert F. Murray, who was saluted by *Time* on December 2 — a pious man engaged in a wholly impious business. Says *Time*: "Death rays missed the bus for World War II. But the U.S. Government took them seriously enough to engage a first-rate engineer, Dr. Albert F. Murray, to examine all suggestions. Recently Dr. Murray told of his experiences with the death projectors. First he decided that a useful death ray would have to (1) burn a half-inch hole in a four-inch plank in five seconds; (2) burn a six-inch live tree two miles away in three minutes; (3) kill small animals at 5,000 feet in three seconds. Reason: anything milder would not be valuable militarily. He examined lots of death rays, which inventors claimed could melt rocks, kill animals at great distances. None met his specifications. Some were fakes; their inventors fled as soon as Dr. Murray hove in sight. Best performer: a heat-projecting gadget which, its inventor claimed, cooked a canary (in Spain) at 30 feet. But now, Dr. Murray feels, the death-ray business may be looking up. After V-J day, a promising idea was presented to Government scientists. The inventor was told to continue his work in private, with Government blessing. The new, encouraging factor is probably atomic energy. Chief trouble with earlier death rays was that no known source of radiation was strong enough to kill at a distance. But atom bombs do kill by radiation, mostly heat and gamma rays. If a method is developed to concentrate nuclear radiations into a narrow beam,

death rays may be available to enliven World War III."

The third youngster born into this issue accompanies the beginning of respiration with a cry for recognition. Eli Berman has reopened his chain of radio stores, closed by the war. When radio itself was a struggling infant, he foresaw its tremendous future. In the early days he pioneered in manufacturing sets. With the knowledge gained from this practical experience, he set out to bring to the public the finest radios that could be obtained and since 1922, when the first Berman chain was established, Eli has grown with the radio field. During the late, lamented international unpleasantness — when, as a matter of fact, relatively few people were wearied and disgusted by the fighting — Eli worked in the Radiation Laboratory located in the back yard at M.I.T. Now he's opened a new store at 71 Market Street, Lynn, and continues, with his brother, Leo, to grow up with radio.

The last of this month's news babies is John R. Markham, a modest man if ever there was one. Indeed, our scout who frequently puts his ear to the ground in Westfield, reports that he enjoyed luncheon there one day with an engineer in the airport business who said, "I have never met anyone who knew as much as Markham knows who was so modest about it. There are lots of college profs who assume a pose of intellectual superiority which is annoying rather than impressive, but not John Markham."

Well, the four news babies are born, and they are all boys! — GRETCHEN A. PALMER, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

Ralph Gilbert writes: "Next summer we can say, 'Only two more years to our next reunion.' By then (1949) there'll be a few more grandfathers — not me, though my son, Robert, will be ready to enter college, and my daughter will be halfway through high school in 1949, our 30th year reunion." — Laurance M. Dalton sent in, as his present address, Liberty Mutual Insurance Company, 1122 Fourth Avenue, San Diego 1, Calif. — Lewis E. Hartman, who is with Miller and Hartman, 243 West Lemon Street, Lancaster, Pa., sent in his regards.

Roger T. Hall, 2720 Wisconsin Avenue, Washington, D.C., sent his best wishes with the following news, "I am back at my old construction business on the old stamping grounds after an absence of four years on active duty in the Navy. Last spring they pinned a Bronze Star medal on my sunken chest for the fine performance of my men on Okinawa during that final campaign, so I feel well compensated for the interruption in my fortune-making. Except for Fred Hewes and Ted Saunders, who were associated with me at one time or another during my Navy assignments, I've seen none of my '19 friends for years — but hope the new peace will change all that."

Charley Chayne dropped a line from 3302 Westwood Parkway, Flint 3, Mich., saying, "No news, just busy as usual." — Dan Hall telephoned me in November that he is now with Singmaster and Breyer in the Graybar Building, New York City,

and is working on foreign projects for them. — Cutter Davis has sent in the following note: "The most important news of me and my doings is that I have sold my business, which, as you know, has been the manufacturing of speed reducers under the name of Winfield H. Smith, Inc. The new owners will conduct the same business with the name of Winfield H. Smith Corporation. I shall probably devote my business time to the Abrasive Shot and Grit Company, in Springfield, a smaller business of which I am a part owner."

Benjamin H. Bristol, 28 Union Street, Foxboro, Mass., wrote briefly, sending his regards with the comment, "Work and more work." — Wayland S. Bailey comments as follows, "I am now a member of the Technology Faculty and feel very happy to have 'come home.' It's the Mechanical Engineering Department in which I function — mostly Testing Materials, some Applied Mechanics." — The last address we have for Henry S. Derby is Delta Base Section, Theatre Service Forces, European Theatre, A.P.O. 772, care of Postmaster, N.Y.C. If anyone knows of his present whereabouts, your Secretary would appreciate being informed.

We received the following memorandum regarding one of our classmates: "William H. Bassett, Jr., after six months at the industrial college for the armed forces in Washington, is now commanding officer of the ammonium nitrate plant which is being operated by the Hercules Powder Company at Louisiana, Mo. Orders are to get the plant in full production as soon as possible so that synthetic ammonium nitrate fertilizer can be shipped overseas to the countries that had their farming activities disrupted during the war years and suffered a loss of output owing to lack of sufficient fertilizer. The plant was taken all apart in 1945 and later transferred to the Bureau of Mines for an experimental synthetic oil hydrogenation demonstration unit. In July the transfer back to the Ordnance Department was completed, and in September water was pumped through the water plant as the first step toward complete plant operation. It was expected that ammonia would be shipped in October."

The following dispatch from Bremen, Germany, about Captain Carley H. Paulsen was carried in the *Boston Globe* on October 2: "Captain Paulsen, USNR, of Hingham, Mass., now stationed at the U.S. Navy's Weser River base, has been notified that he has been honored by the British with the C.B.E., Commander of the British Empire, Military Division. The King will present the insignia to Paulsen and other Americans, it is understood, at a ceremony in London. The award is in recognition of Capt. Paulsen's work in England prior to the invasion. He played an important part in fitting smaller craft for the channel crossing. Official notification came to Capt. Paulsen from Sir Henry Markham, K.C.B., M.C., Secretary of the Admiralty, and read as follows: 'Sir, I am commanded by My Lords Commissioners of the Admiralty to inform you that they have learned with great pleasure that, on the advice of the First Lord, the King has been graciously pleased to give orders for your honorary appointment as a Commander of the Military Division of the

Order of the British Empire for distinguished service to the Allied cause.' . . . Capt. Carley H. Paulsen of Hingham is a Naval veteran of both world wars. He served in World War I as an ensign. His wife, the former Helen Sibley of this town, joined him in Germany the past summer. They have two children, Mrs. Edward Hastings of Wellesley, and David Sibley Paulsen, who served as a fighter pilot in the Pacific and who has recently been discharged from the service. The family residence is on High Street." — EUGENE R. SMOLBY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York, N.Y. — ALAN G. RICHARDS, *Assistant Secretary*, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

1920

As a result of the thoughtful co-operation of Don Carpenter '22, we have the news of Herb Dorr's untimely passing. Herb died at his home in Ilion, N.Y., very suddenly on August 10. He leaves his wife, Ailie, and three children. For a number of years he was with the Du Pont Viscoloid Company in Leominster, Mass. In 1940, he was made works manager of the Remington Arms Company's Lake City ordnance plant which, at the time, was nothing but a few lines on a few pieces of paper, but under Herb's direction became a full-fledged, high-production ammunition plant. He was repeatedly called upon to expand the plant until it employed a total of 21,000. In 1944, after the ammunition crises had been largely overcome, Herb went to Ilion as works manager of the Remington Arms plant there. He was successful in maintaining high morale while bringing about a rapid conversion to peacetime operations. Herb brought to his business career the same quality of leadership and teamwork that made him an outstanding track star and glee club leader at the Institute. His loss is sincerely mourned by the entire Class.

Creighton Stanwood has been elected vice-president and manager of manufacture of the Great Northern Paper Company. He has been with Great Northern practically ever since he graduated. During the war period he served on Office of Price Administration and War Production Board advisory committees for the newsprint industry.

A. A. Brown has lately been advanced to the position of assistant general manager of the Mexican mining department of the American Smelting and Refining Company. Dolly Gray is now living in Wilton, Conn. Erwin Harsch is back in these parts from Richmond, Va. His present address is 37 Kenwood Street, Brookline. Alfred Peterson is with the International Automatic Electric Corporation, Montevideo, Uruguay.

William Welch is with the Furriers Customers Syndicate, 99 John Street, New York. Igor Zavarine is with Sylvania Electric Products, Inc., Bayside, Long Island, N. Y. Harold Seavey is president and treasurer of Seavey and Company, 420 Boylston Street, Boston. I just met him on the street, and he has changed very little from 27 years ago. He and Mrs. Seavey live in Braintree. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

A report from the Alumni Fund indicates that some 20 per cent of our readers have not so far sent in a check to insure that The Review will continue to arrive. Although our average contribution is close to our goal of \$15, the total for the current Fund is substantially below the figures for last year at the same time. We hope this reminder will make it unnecessary to write individual letters.

By coincidence, as these notes were being prepared, the M.I.T. *Victory* arrived in New York with troops returning from abroad, a reminder that many of the 141 members of the Class who served in the armed forces have returned to civilian life. Most recently in mufti are Lewis W. Moss and Williston Wirt. Lew, who formerly was assistant engineer of the maintenance of way department of the New York Central Railroad, saw service abroad with a railway operating battalion and held the rank of lieutenant colonel. He is now in Chicago, where his address is 11148 South Union Avenue. Will Wirt, one of the two ministers in the Class, relinquished his pastorate at the First Congregational Church of Eugene, Ore., to serve as chaplain at an Army camp in Tucson, Ariz. Dr. Wirt's new address is 255 Center Street, Chula Vista, Calif.

Of the regular Army officers, Raymond G. Moses, a brigadier general, has been given charge of the New England Engineer District. Before the war, he had been district engineer of the Vicksburg, Miss., district, and during hostilities he served as director of military supply for the Corps of Engineers. He holds the degree of officer in the French Legion of Honor. Henry Hutchings, Jr., also a brigadier general, has been assigned as district engineer in charge of the southwestern division of the Corps of Engineers with headquarters in Dallas, Texas.

Word has been received from the Institute of the death on May 10, of Loring Cavanaugh Creamer, formerly of Sorrento, Maine, and Waban, Mass. Loring was associated with the Class in our junior year in Mechanical Engineering and Engineering Administration.

Hard on the heels of the announcement that John W. Barriger, 3d, had been made president of the Monon (Chicago, Indianapolis and Louisville Railway), came a lengthy essay in the *Wall Street Journal* quoting Jack's modernization plan for making the line a major proving ground for super-railroading. New equipment and improvement of the entire roadway are under way; new signaling and communication methods have been adopted, including radio transmission between trains and way stations, teletypewriter service for dispatching, and radar equipment for experimental use. The article refers to Jack as America's youngest railroad president and says that he got there by way of M.I.T., the Pennsylvania, the Union Stock Yard and Transit Company, the Toledo, Peoria and Western, the railroad division of the Reconstruction Finance Corporation, for which he was chief examiner, the Office of Defense Transportation, for which he was assistant chief for railroads, and Fairbanks Morse and Company, where he organized the diesel locomotive division.

His plans for fast mass transportation at a price by operating many long trains on the Monon at speeds over 100 miles an hour include the elimination of steep grades and sharp curves, modern rolling stock, self-contained electric locomotive power, and the stiffest rail the road can afford. Despite the expense, he contemplates substantial earnings on the capital stock through resulting increase of traffic and reduction of operating expenses.

David O. Woodbury has added lecturing to his many varied pursuits in the literary line. He was recently the guest speaker at the Elmwood Women's Club of Providence, R.I., on the subject of "Your Life Tomorrow." The New York *Herald Tribune* book section lists *American Diplomacy in the Far East* by Kuo Chou Li.

Philip T. Coffin of the Aluminum Company of America, served as leader of a round-table discussion of "Corrosion Protection" under the auspices of the New York section of the American Institute of Electrical Engineers.

Manuel S. Vallarta was in this country most of last year as the representative of Mexico on the United Nations commission for the control of atomic energy. Val is a professor in the Polytechnic Institute of Mexico and has achieved international fame as a physicist and as a mathematician. A recent note gives his address as Puente de Alvarado No. 71-5 piso, Mexico D.F., Mexico. Donald S. Cheney reports leaving Wellesley, Mass., to take up residence in Hamden, Conn., at 90 Belmont Street. Hazen C. Pratt gives his address as 3216 Idaho Avenue, Minneapolis 16, Minn., and Holland L. Robb a colonel, has been given an assignment overseas for which his mail address is Headquarters, XXIV Corps, A.P.O. 235, care of Postmaster, San Francisco, Calif.

George E. Farmer, communications engineer of the Tennessee Valley Authority in Chattanooga, Tenn., whom we share with 1922, telephoned between trains in New York to say that his older boy is heading for the University of Tennessee this year and maybe for Bob Neyland's Vols. The second boy is in high school. Our sympathy to Gef and his sister on the recent death of their father.

Zam Giddens says that further contributions are necessary to meet the needs of the Class Gift fund. Jack Rule is busy with the Institute's architectural committee, and the war records are being checked. Probable costs indicate that we now have far less than the required amount. If you have not already contributed, send your check with a note to your Secretary today. — CAROLE A. CLARKE, *Secretary*, International Standard Electric Corporation, 67 Broad Street, New York 4, N.Y.

1923

You should by now have the Secretary's letter regarding the favorable position we are in for making an appropriate class gift on our 25th anniversary. I hope some of you will find useful the establishment of a 25-year fund with Mr. Ford, Treasurer of the Institute, to take care of special categories of class members who may wish to participate in the class gift but have not, up to now, participated in the insurance fund. To the 137 members of the Class who have kept up their endowment policies,

special thanks are due, but there are still more than three-quarters of the Class who might like to get in on this 25th anniversary gesture.

George H. Southard reports that he is back in Washington with the Patent Office. My last news of him indicated that he had been in the South Pacific as a major of Engineers. — A release from the United States Engineers Office in Boston, says that A. C. Stewart, a lieutenant colonel, is in charge of the real-estate division of that office, having returned there after two and one-half years in the southwest Pacific. He resides with his family at 344 Beaver Street, Waltham, Mass.

Arthur I. Reynard writes that after spending the war years in the Radiation Laboratory at the Institute, he accepted a position with the Naval Research Laboratory in their special electronic research division. He says that he has finally found an apartment in Washington and has brought his wife and son there. — Clarence P. Thayer is active in the affairs of the Dade County, Fla., Sanitariums. A clipping from the Miami, Fla., *News* indicates that he was scheduled to read a paper on food poisoning before this group in November.

Richard L. Bowditch is president of the New England Council and was recently the subject of a Boston *Traveler* editorial in connection with his proposal for public education about the methods used by labor which tend by coercion to disrupt our economy. He appears to have in mind the development of a proper method of dealing with unreasonable strikes. — Several other members of the Class have been mentioned in newsprint. A Newspictures release of December 9 or thereabouts, shows one Class President, Bob Shaw, presenting an award of merit to two or three gentlemen responsible for developing a new pattern of theatrical presentation: the Ice Follies. This was made on behalf of the New York Museum of Science and Industry, of which he is director. — William Arthur Gallup appeared in a photograph in the Boston *Herald* on December 12, as a member of the committee from the Episcopal Diocese of Massachusetts which notified the Reverend Norman B. Nash of his election as bishop coadjutor. — HORATIO L. BOND, *Secretary*, 457 Washington Street, Braintree 84, Mass. HOWARD F. RUSSELL, *Assistant Secretary*, Improved Risk Mutuals, 60 John Street, New York 7, N.Y.

1924

From our President, Bill Robinson, comes this message, addressed to the Class: "With our 25th reunion only a little more than two years away, each member of the Class of 1924 is entitled to a report of progress on our plans. Your officers include Chick Kane, Vice-president, Bill Correale, Treasurer, and Frank Barrett, Secretary, and the four of us constitute an executive committee. Our class organization has recently been strengthened by four appointments which I know you will welcome, as follows: Nip Marsh, 1924 representative on the Alumni Council, Wink Quarles, Assistant Class Secretary, George Parker, class representative on the committee for our 25th reunion, and Frank Shaw, class representative for the Alumni Fund. You will be kept informed of our class plans both by direct mail and through

the columns of The Review. Your individual suggestions on the reunion, or any other class subject, are earnestly solicited. I apologize for our shortcomings in the past and pledge that from now on we will be represented in every possible issue of The Review. Each member can help by considering himself a committee of one to be responsible for sending in to Frank Barrett or Wink Quarles one item each month.

"In order to start the ball rolling, I submit the following news for this issue: Mac MacNaught, who is with McGraw-Hill and editor of *Electrical Contracting*, and Don Moore, who runs the Cleveland office of Liberty Mutual, and I had a very enjoyable three-man reunion in Cleveland. Don, as many of you know, had an active military service record and saw plenty of action before leaving the Army last year. He is still looking for a house in Cleveland so that he can bring his family here. Phelps Meaker did important scientific research during the war, also in uniform, and has rejoined the engineering division of the General Electric lamp department at Nela Park. Bill Cook was stage manager for the G. E. show which was produced for Association Island Camps. (G.E. has owned for many years an island at the extreme eastern end of Lake Ontario, which is available for company meetings. This island was reopened this summer after being closed for eight years.) Bill Correale, a major in the Army Engineers, recently returned to New York from the occupation forces in Europe. The word is that he intends to continue his Army career for the present. If any of you is ever in the vicinity of Cleveland, I should be delighted to see you at Nela Park, which is the lamp and lighting headquarters of the General Electric Company."

Wink Quarles, our New York correspondent and Assistant Secretary, writes as follows: "Bill Robinson was in town two weeks ago, and he and I had the pleasure of dining together. We naturally discussed remote plans for our 25th reunion, about which you will hear much more and no doubt talk considerably yourselves . . . I am pretty busy with the Tech Club, trying to find new quarters, and am a member of the board of directors of the local Red Cross chapter and chairman of the Darien Disaster Relief Committee."

A half-page story in the Providence *Journal* concerns "Inventor Bob Lawson" and the wide range of "intriguing mechanical and technical subjects" covered in the Lawson Products Company in Pawtucket, described as the most diversified plant in Rhode Island. — FRANCIS A. BARRETT, *General Secretary*, 234 Washington Street, Providence, R.I. WILLIAM W. QUARLES, *Assistant Secretary*, Hollow Tree Ridge Road, Darien, Conn.

1925

You fellows have an apology due you for the failure of any '25 notes to appear in the first three issues of Volume 49 of The Review. Most of the items included below, however, reached me only in time for the December issue, had I been able to compile them. So, with my regrets for the delay, I'll proceed with the news.

First, I must tell you of no less than five deaths which have occurred among our

membership. The earliest of these is that of Charles R. Mize, a captain in the United States Army Finance Department. This took place on June 2, 1943, in the Philippine Islands (during the Japanese occupation). Captain Mize was stationed in Manila, and although we lack details, it is probable that he died while being held in a Japanese prison camp.

Frank L. McDonough of 4 Fellows Place, Roxbury, Mass., died on November 29, 1944. We did not receive word of his passing until late spring of this year, and I am sorry that I am unable to report the cause, or to tell anything of his career up to that time. Possibly some of his friends in Course IV may be able to supply this information.

Only recently the Alumni Office was informed of the death of Leland R. Van Wert, V, on March 26, 1945. Beyond the fact that for a time he was associated with the engineering school of Harvard University, and that for the last six or seven years before his death last year he was in the employ of Leeds and Northrup Company in Philadelphia, no more information is now available. If any of his associates at that company should read this, I would appreciate hearing from them as to his work with the firm, and the cause of his death.

Bill Adams, X, died in Wilmington, Del., on June 28 of this year. His wife, the former Ruth Fries, of Newark, Del., kindly sent in the following information on his work and his interests, together with his family background: "William Hussey Adams, Jr., of Newark, Del., was born in Lawrence, Mass. on January 16, 1903, the son of William Hussey and Susan Sharp (Pratt) Adams, and died in Wilmington, Del., on June 28, 1946. He was a graduate of Technology in 1925; he became technical director of the Haveg Corporation, Marshallton, Del., was a member of the American Institute of Chemical Engineers, the American Chemical Society, the Society of Mayflower Descendants of Pennsylvania, and [the] national society of the same, the New England Historical and Genealogical Society, and the Lion's Club of Newark, Del.; he was also vestryman and lay reader of St. Thomas Episcopal Church of Newark, Del. He was a holder of many patents in the technical field, and was a contributor to numerous technical publications." She adds that they had two daughters, Ruth Suzanne, and Elizabeth Starbuck, Adams, whose ages she does not mention; but since she and Bill were married on October 2, 1932, both must be quite young. Let me here express the appreciation of the Class to Mrs. Adams, for taking time in the midst of her bereavement to supply Bill's classmates with the essential facts of his life. And I also want to send the deep regrets of the Class with my own on the passing of the husband and father of this young family.

John B. Franks, a brigadier general, who was deputy chief quartermaster of the Communications Zone of the European theater during the war, died on November 13 at the Walter Reed Hospital after a long illness. The account in the New York *Times*, reads as follows: "General Franks was born in Leavenworth, Kansas. . . . In November, 1945, he was appointed special assistant to the Commanding

General of the American Graves Registration Command. He received the Legion of Merit for his services in Washington as Assistant Chief of Procurement of the Resources Branch of the Quartermaster General's Office, and received an Oak Leaf Cluster in lieu of a second Legion of Merit for his overseas service. . . . General Franks began his Army career as a private in 1917 after being graduated from the University of Michigan. The general leaves a widow, the former Mrs. Ora Hicks of Jackson, Tennessee, and a stepson, Lieut. George E. Grimes. General Franks was commissioned a lieutenant during the first World War and served overseas with the AEF. He received an M.S. degree from the M.I.T. in 1925 and was graduated from the Army Industrial College in 1936 and the Quartermaster School in 1937."

In concluding this mention of the deaths of our five classmates, I suggest that we pause a moment and pay tribute to our friends, both civilian and military, whose recent passing is, at least in part, a testimony to the difficult times through which this country and the world have just passed, and resolve that each of us will do all in his power to prevent a recurrence of war and desolation.

The next group of items concerns four promotions or appointments of class members. A clipping from the Newark, N.J., *News* contains the following excerpt: "Herbert A. Lafler [VI-A, S.B., M.S., 1926] who has been plant superintendent [of the New Jersey Bell Telephone Company's] northern division, has been appointed general plant manager. . . . Lafler entered the telephone business after graduating from M.I.T. . . . Starting as a student engineer, he has served in practically every field position in the telephone plant organization. In 1934 he was made district equipment superintendent in Jersey City, and in 1936 district plant superintendent in Camden. During the war he served for a time as assistant to the general plant manager directing the work of protecting telephone personnel and property against the threat of air raids. Lafler lives in Maplewood."

Last May the University of Illinois announced the appointment of Arthur L. Samuel to its electrical engineering faculty. The release continues: "Professor Samuel will carry on research and development work on electron tubes and direct the work of graduate students in this field. Since 1928, he has been active in the vacuum tube research and development activities of the Bell Laboratories. . . . From 1928 to 1931, his chief research interest was the development of gas rectifiers and thyatrons. Since 1931, he has been active in the development of vacuum tubes for use at ultra-high frequencies. Professor Samuel was born in Emporia, Kansas, and received the A.B. degree in mathematics from the College of Emporia in 1923. This spring the college honored him with the S.D. degree. From 1923 to 1926, he was enrolled in the co-operative course in Electrical Engineering [VI-A] at M.I.T., receiving the S.B. degree in 1925 and the S.M. degree in 1926. He has taken additional graduate work there and at Columbia University. Before and during his co-operative training he was associated with the General Electric Company. From

1926 to 1928, he was an instructor in Electrical Engineering at M.I.T."

The following release from the Edison Electric Institute, dated June 10, concerns Alva B. Morgan, VI: "A. B. Morgan of Darien, Conn., has been appointed assistant managing director of the E.E.I. . . . Mr. Morgan has been the rate and power consultant for E.E.I., heading both the rate and general service departments. In his new position he will assist Colonel E. S. Bennion in the supervision of the institute's operations and will also continue his present responsibilities. A graduate of M.I.T., Mr. Morgan joined the National Electric Light Association, predecessor of E.E.I., in 1927 as an assistant engineer. He specialized in codes and standards activities, representing the electric light and power group on committees of the American Standards Association. . . . He was promoted to engineer in 1933, and later became rate and power consultant. He has acted as staff representative of the industrial power, rate research, and postwar planning committees. Mr. Morgan is a member of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers. He has served for the past 15 years on the A.S.M.E. Oil Engine Power Cost Committee, and is recognized as an authority in this field."

From the Worcester *Gazette* of July 2 comes the following: "Kenneth W. Proctor [II], formerly assistant manager of the Malden Electric Co., has been appointed district superintendent of distribution [of the Worcester County Electric Company] with headquarters in Worcester. . . . Mr. Proctor, a native of Peninsula, Ohio, was educated in the Malden public schools and was graduated from M.I.T. in 1925 with a B.S. in Mechanical Engineering. Following graduation, he joined the Malden Electric Co., as a student engineer. He became assistant electric engineer at Malden in 1927, assistant superintendent in 1934, superintendent in 1937, assistant general superintendent in 1938, and general superintendent in 1939. In March, 1943, he was made assistant to the manager of the Malden Companies. During the War he was a member of the Coast Guard Temporary Reserve associated with port security." He has been living in Melrose with his wife, Mrs. Dorothy Proctor, and their two sons, Kenneth Jr., and Richard. They plan to reside in Worcester.

Theodore Herrick Butler was married on October 20 to Ethelind Chapman Reed of Marblehead, Mass., according to a news item in the Salem, Mass., *News*. The Rev. Don W. Condon, Ted's former chaplain overseas, performed the ceremony at St. James Episcopal Church in Woodstock, Vt. The item continues: "Miss Reed is the daughter of Mrs. Charles M. Reed of Sodus Point, N.Y., formerly of Marblehead and Washington, Penna. She attended Wilson College and graduated from the University of Pittsburgh." It further states that Ted is the son of Mrs. Harry Butler Sr., of Marblehead, formerly of Bangor, Maine, and gives the following outline of his career: "Mr. Butler was graduated from M.I.T. and the Harvard Business School advanced management program. He has been an employee of the New England Power Service company of Boston, was a lieutenant commander in the U.S.

Navy during the war years, with duty in the South West Pacific. He is now employed by the Green Mountain Power Corporation of Montpelier, Vermont, where the couple will make their home."

Here are two items for which we are indebted to Charlie Locke '96: "Feliciano T. Roque writes from the Philippines that he was chief chemist and assayer of the San Mauricio Mining Company when the war broke out, but that the war left the mine so that operations cannot be resumed for about two years. He has plans for starting in the meantime a small business of manufacturing varnish from several local resins which occur abundantly in his concession there."

Also the following: "Pierre Wibaut, who is manager of the Cairo tramways in Egypt, says that their war work was less spectacular than the wonderful research at M.I.T. With great pains the trams were kept running in spite of a shortage of spare parts; and on special trams troops were carried between the main Cairo camps at the time of El Alamein, so that the company had the satisfaction of feeling that it was able to help at a critical moment." I might add that if any of you are interested in seeing what kind of equipment Pierre had to work with, you could look up the March, 1946, issue of the *National Geographic Magazine*. In the upper illustration in color, Plate VIII, on page 324, is a street scene in Cairo, showing one of the trams.

From the Washington *Star* of May 18 comes this item: "Malcolm G. Davis [I], son of Herbert L. Davis of 1852 Columbia Road N.W., former auditor of the U.S. Supreme Court, will leave shortly to fly to Australia in connection with engineering projects. He is vice president and chief hydroelectric engineer of Gilbert Associates, Engineers, and has been working in New York for the firm. A native of Washington, he was graduated from Central High School in 1920, and from the M.I.T. in 1925."

The following story, which appeared in the June 14 issue of the Boston *Globe*, is of current interest: "Dr. K. T. Bainbridge is a native of Cooperstown, N.Y., and graduated from M.I.T. in 1926. [Note: This refers to the date of his degree. He is officially a member of our Class, and was in Course VI-A, which accounts for his receiving his degrees in the later year.] He took his M.S. degree in the same year. Princeton gave him an A.M. degree in 1927, and two years later he took a Ph.D. degree from the same institution. Harvard awarded him an honorary A.M. degree in 1942 after he had served as assistant professor of physics from 1934 to 1938 and associate professor since that time. In 1940 he became technical consultant of the National Defense Research Council. Dr. Bainbridge was in charge of the actual detonation of the first atomic bomb July 16, 1945, in New Mexico. He holds patents on photoelectric cells, electronic multipliers and electromagnetic pumps. He is married to the former Margaret Pitkin of Swarthmore, Pa., and they have three children, Martin Keeler, Joan, and Margaret Tompkins Bainbridge. With Dr. Edward B. Jordan of the Research Laboratory of Physics, he constructed in 1936 a new 'atomic scale' for the weighing of

individual atoms, known as a mass spectrograph."

Although rather long, I am quoting nearly in full an item which appeared in the North Reading news column of the *Lawrence, Mass., Eagle* on August 1, interesting because it gives a good account of the only member of our Class, so far as I know, who has entered the ministry. It reads as follows: "Rev. Robert S. Stansfield [XV], former pastor of the First Baptist church will return to the pulpit . . . (as guest preacher). . . . Rev. Mr. Stansfield's Christian experience has been most unusual. He came to North Reading as Capt. Stansfield, a veteran of World War I and a director in charge of the youths at the Harold Parker Forest Reservation. He was an honor graduate of M.I.T. Through the influence of Rev. Elmer N. Bentley, pastor of the local church . . . Rev. Mr. Stansfield became interested in the religious side of young people's work. Following the resignation of Rev. Mr. Bentley, Rev. Mr. Stansfield was accepted to lead the local church. He attended divinity school, completing the four-year course within the space of two. . . . He accepted [a] call to the Blaney Memorial church in Dorchester. From there he went to Auburn, N.Y. He was temporarily released by the New York church to serve as chaplain in World War II. He was among the group honored by the Northern Baptist convention."

Two clippings have come in recently dealing with the activities of Tom Camp as a consulting engineer on waterworks problems. One is from the *Cambridge Chronicle* and refers to his helping find the cause of a series of water-main breaks in that city. The other is from the *Middleboro, Mass., Gazette*, and tells of his being called in in connection with a proposed water system survey. From the latter paper on March 15, I quote the following brief account of his career: "Mr. Camp has had wide experience on water and sewage projects in various states. . . . He received a B.S. degree from Texas A. & M. college in 1916 and an S.M. degree from M.I.T. in 1925 [Course I]. He was professor in charge of sanitary engineering at M.I.T. from 1929 until 1944, and is registered as a professional engineer in Massachusetts, Maine, Connecticut and Rhode Island. He is at present vice-president of the New England Sewage Works Association, and is a member of both the American and the Boston Societies of Civil Engineers, the American Water Works Association, the American Public Health Association and the New England Water Works Association. He is the author of 35 technical and scientific papers and discussions and has been awarded several prizes and medals. . . ."

You fellows will note that most of the above items came from The Review's clipping service. Although we are glad to have them and copy them, some firsthand news is very much needed — letters and memoranda from and about class-members. See what you can do, won't you? — HOLLIS F. WARE, *General Secretary*, P. O. Box 52, Godfrey, Ill. F. LEROY FOSTER, *Assistant Secretary*, Room 5-105, M.I.T., Cambridge 39, Mass.

1926

To date, there has been a substantial number of generous contributions and

pledges to the class endowment fund, in response to the appeal sent out by Eben Haskell and his committee. In terms of the total number in the Class, however, the number of contributors is still small, although it is hoped that when we have passed the inevitable time lag in a program of this sort, the Class as a whole will be more completely represented. Members of the Class who have questions about the endowment fund are encouraged to write to the Secretary, to Dave Shepard, or to Eben Haskell.

We have word this month of several classmates concerning whom we have had no news for some time. Stanton West, who served as a major in the Army, is now vice-president and secretary of the R. C. West Tool and Die Corporation in Depew, N.Y., and is living in Rochester. Malcolm Epstein, after service as an Army lieutenant, is with Scherck Richter Company in Jefferson City, Mo. Samuel Welch, whose home is in Chevy Chase, Md., is now administrative officer with the central radio propagation laboratory of the National Bureau of Standards in Washington. He was a lieutenant in the Navy during the war. Ralph Blake, port engineer with Boland and Cornelius in New York City, lives in Milford, Conn. Likewise residing in Connecticut is Albert Libbey, whose address is West Point Road, Stony Creek. Donald Dodge has been transferred by the United States Rubber Company from Des Moines, Iowa, to Manchester, N.H., and Paul Jewell is now with Flanner House in Indianapolis. — JAMES R. KILLIAN, JR., *General Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

1927

We have received word of the death of a prominent and popular member of our Class. Warren D. Smith died suddenly on December 1. Upon his graduation in 1927, Warren entered the tar products division of the Koppers Company and was placed in a training course, in which incidentally Ray Hibbert and Bill Reed also participated. Upon completion of this course, he went into accounting — statistical work, becoming an expert on International Business Machines and worked at Chicago, Follansbee, W.Va., and Pittsburgh. From 1940 to 1943, he was with the Carnegie-Illinois Steel Company, but returned to Koppers late in 1943 as director of the budget department. He was a member of Delta Theta Delta fraternity and a graduate in Course XV-2. A widow and small daughter survive him. The home address in 1942 was Box 68, Bradfordwoods, Pa.

Further word is now at hand concerning our reunion. The information will be sent to all members of the Class by mail, but it is repeated here as a reminder: The place is East Bay Lodge, Osterville, Mass.; the time is Saturday and Sunday, June 21 and 22, but there will be plenty of space available for those who wish to arrive on Friday, the 20th.

Bob Wise, according to the *Boston Post*, has been named as director of the International Association of Ice Cream Manufacturers. He already held the post of president of the National Ice Cream Company and the New England Association of Ice Cream Manufacturers. — John A. Swift, former chief metallurgist for the Billings and

Spencer Company, is now associated with the Heatbath Corporation of Springfield, Mass., as metallurgical engineer and New England representative. — The following notice has been received from the register of former students: "James L. O'Dowd has joined the Cistercian Monastery at Valley Falls, R.I., — a very strict order which permits almost no contact with the outside world."

The general superintendent of Goodyear's plant at São Paulo, Brazil, is Larry Coffin. He has written to Alf Burley the following concerning his activities: "I returned from Brazil in the latter part of the year 1941, with the idea of settling permanently in the United States, but unfortunately the war altered my plans, as it has those of many others, and I have found myself back in Brazil, helping to produce as many tires as we can at the Goodyear factory in São Paulo. Now that the war is over, I hope that the opportunity permanently to rejoin my family in the States will soon arise."

The Carolinas' Piedmont section of the American Chemical Society recently elected Dave Truax as its chairman. Dave has lived in Charlotte, N.C., for a number of years, where he works for the Stein, Hall and Company, large starch manufacturers. He has two children, one-sixth dozen, assorted. — Those of you who read the magazine *Product Engineering* may have recognized Tony De Napoli on the front cover, in at least four colors. His present status is that of engineering manager of the Gray Manufacturing Company, makers of the Gray audiograph, a dictating machine using vinylite records. — Your correspondent has returned from Europe and takes this opportunity to wish you all the best of years in 1947. — JOSEPH S. HARRIS, *General Secretary*, Shell Oil Company, Inc., 50 West 50th Street, New York 20, N.Y.

1933

We noticed in the October 29 issue of *New York News Record* that S. J. Hungerford has been appointed district sales manager for the nylon division of Canadian Industries, Ltd. — A note from Dave Nason, purchasing agent for the Westinghouse Electric and Manufacturing Company at Baltimore, reads in part as follows: "I left my insurance business in Boston in April, 1942, to come to work for Westinghouse. After working in Baltimore, Philadelphia, Pittsburgh, and Philadelphia again, I was transferred in April of this year back to Baltimore. I am still living in Philadelphia and commuting daily between Philadelphia and Baltimore. I am convinced that the 'Pennsy' doesn't have soft cushions in any of its coaches."

At a recent get-together in New York, Dick Valentine stopped in for a little while before taking a plane back to Cleveland. He is presently in charge of the Cleveland office of the New Departure Division of General Motors Corporation. His work consists mainly of sales engineering in that area. — A card received from Donald R. Neil, XVII, says in part: "I am now out of the Army and with Paul A. Straub and Company at 19 East 26th Street, New York City. We have been fortunate in buying a home in Short Hills, N.J., and plan to make this area our permanent home."

When last heard from, Bob Swain was still in Cairo, Egypt, with Trans World Airline, and Christmas cards have been received from him at that point. Bob McCormack is still with Raytheon in Newton. He had recently been down to see Emerson Norris. That's all the news for now until next month. — **GEORGE HENNING, JR.**, *General Secretary*, Belmont Smelting and Refining Works, Inc., 330 Belmont Avenue, Brooklyn 7, N.Y. **ROBERT M. KIMBALL**, *Assistant Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

1935

We have word of Al Boyajian's signal contributions to aeronautical engineering during and since the war. On graduation, Al joined the Army Air Forces Reserve and served for two years as a lieutenant at the Logan Airport in East Boston. Between 1937 and 1939, he worked as a structural engineer for the Curtiss-Wright Corporation in St. Louis, but took at least some time off to be married to Grace Nakashian of Wellesley in 1938. In 1939, Al joined the engineering staff of the Republic Aviation Corporation, Farmingdale, Long Island. While with Republic, Al has had much to do with the design of P-44 and P-47 Fighters, and more recently with the adaptation to low-cost production of the Seabee, an amphibian for private flying enthusiasts. Al is credited with a number of revolutionary advancements in aircraft design.

Paul Panagiotakos, who remained at school to earn a doctor's degree in chemistry, has recently been promoted to the rank of assistant professor at the Lowell Textile Institute. — **Ed Dougherty**, who served as a lieutenant commander in the Navy during the war, was married recently to Helen Murray Barrett of Trenton, N.J. Ed received a master's degree from the Wharton School at the University of Pennsylvania after graduation from Technology, and is now with Westinghouse in Philadelphia.

Another and interesting wedding to record is that of Louis Fong to Cornelia Wong of Shanghai. Louis served as a major with the Army Air Forces, and as an electrical communications officer was among the first American servicemen to land in China after V-J Day. It was then that he met Miss Wong. They were married in the Mount Vernon Church, Boston, this past November and are living in Peabody.

Bob Madden, a former mining engineer turned metallurgist, received his honorable discharge from the Navy last summer and has become associated with the Kaiser Steel Company as superintendent of the chemical, metallurgical, and inspection departments of the Kaiser mill at Fontana, Calif. While in the Navy, Bob was a metallurgist in the Bureau of Ships, Washington.

A terse change of address notice informs us that Wes Loomis is back at the old stamping grounds, Kansas City, his address being Loomis Advertising Company, 20 West Ninth Street. Jack Tebbetts, George Morrisette, and Bill Fry are a few of many classmates who have become just plain civilians again. Jack is living in Wellesley, George in Pittsburgh, and Bill lives or works in New York City. The

incoming mail doesn't submerge me. How about it, fellows? — **J. BARTON CHAPMAN**, *General Secretary*, 7 Lalley Boulevard, Fairfield, Conn.

1938

Willard Libby who is now working in Rochester, N.Y., has become engaged to Rebecca Stribling of Pasadena, Calif. Willard's fiancée was in the first class of WAVES to be trained and rose to the rank of lieutenant. Another November engagement of class interest is that of Doris Smith of Plainfield, N.J., to Harold Butler. Harold worked with the Petroleum Administration during the war and later was co-author of the Surplus Property Administration's report on the disposal of aviation gasoline.

Jack Bethel is out of the service and has returned to Metcalf and Eddy, sanitary engineers in Boston. Jack was a major during the war in charge of all sewage disposal plants, waste disposal, insect and rodent control in all Army installations of the Second Service Command, comprising the area of New York, New Jersey, and Delaware. He was awarded the Army commendation ribbon and citation for "outstanding meritorious performance of duties as chief of the sanitary section, utilities branch, office of service command, Army Engineers."

Walter Nolan, who majored in biology, became business agent and organizer of the International Alliance of Theatrical Stage Employees and Moving Picture Operators of the A.F.L. During the war he served with the Army Counter Intelligence Corps and was assigned to the Manhattan engineering district which supervised the atomic bomb project. He is now preparing for law school at Boston University and is also a field representative of the Fair Employment Practices Commission, investigating complaints of discrimination in employment in Massachusetts. — **Tsung-Sen Fong**, who got his master's degree with us, is in charge of the chlorinated water supply for the city of Nanking, China.

Your Assistant Secretary spent a week end recently with Fred and Polly Kolb and Frank and Eleanor Gardner. Fred is with Eastman Kodak, where he has been since he finished at the Institute, and is in the department of manufacturing experiments, a service department for Kodak Park. He is engaged in development work for motion picture film. The Kolbs have a little girl, Carolyn, who is now about a year and a half old. Frank Gardner is at the Pittsfield, Mass., plant of the General Electric Company in the metals section of the works laboratory, working on factory problems and development projects in metallurgical research. He has been with General Electric about a year. Frank and Eleanor have two little boys — Dick, about four years old, and Jimmy, who is two years younger. — **DALE F. MORGAN**, *General Secretary*, Carbide and Carbon Chemicals Corporation, 30 East 42d Street, New York, N.Y. *Assistant Secretaries*: **RICHARD MUTHER**, 180 Elgin Street, Newton Center 59, Mass.; **ALBERT O. WILSON, JR.**, 32 Bertwell Road, Lexington 73, Mass.

1939

We begin with some good news of Major Mel Rosen, who had formerly been listed as a prisoner of war; we find that he has

been released for more than a year now and is well and attending the Artillery School, Fort Sill, Oklahoma. Joel Hoberman has returned to take up his residence in Malden, Mass. After graduation from the George Washington University school of medicine in 1942, he began his practice in that city. Last year he served as director of anesthesiology at the Gallinger Municipal Hospital in Washington; he is currently on the staffs of several Boston hospitals. The final news from press clips tells briefly of the engagement of Ames Bliss to Mrs. Ray Lofton Dudley.

Harking back to the fall of 1935, a bunch of us polar bears recently spent a most enjoyable week end at the Freshman Camp cabin at Lake Massapoag. Although we missed Dr. Compton's pitching for the Faculty team, a fine reunion was had with several '39 and near-'39 men. Bill Brewster, back from 'majoring' in China and Washington for a few years, is again with United Shoe in Beverly, Mass. Morrie Nicholson, soon to be Dr. N., is putting the finishing touches on that aspiration at the Institute, and Jim Laubach is with the Morley Company in Portsmouth (by the sea), N.H. Fred Kolb, Ken Bohr '41, Frank Gardner '38, Al Wilson '38, Bob Olsen '35, and many more were among those present. — **STUART PAIGE**, *General Secretary*, 701 Mill Plain Road, Fairfield, Conn. **ROBERT C. CASSELMAN**, *Assistant Secretary*, 271 Cypress Street, Newton Center 59, Mass.

1940

It is with a great deal of sorrow that I must announce the deaths of several of our class members. Some of these have been withheld for some time, pending official action by the armed services. Charles B. Fodale, a lieutenant, missing in action since November 13, 1942, has been officially declared dead by the Navy Department. Peter P. Bernd, a captain, as a Japanese prisoner of war was being transferred from the Philippine Islands, to Japan, and on October 24, 1944, the ship was torpedoed and sunk in the South China Sea, all on board being lost. Lloyd W. Nash, a major, was killed in action on December 24, 1944. He was commanding a lower level group of bombers when he was shot down over Belgium. John van Schaick was killed in action on January 15, 1945; and John C. Ekeberg was killed in action on June 5, 1945. Arthur E. Frankel, X, died on May 16, 1946.

We received a good letter from George Pollak, a lieutenant commander, which did much to bring us up to date upon his whereabouts and doings for the past six years. George writes, in part, as follows: "I was out in the Philippines when the war broke out and after going through the mill on Bataan, Corregidor, and some of the other islands, I finally got caught in June of 1942. I spent the next few months in various prison camps in the islands and in November, 1942, arrived in Japan. From then until September of last year, I was around the Tokyo-Yokohama area and later in the northern part of Honshu. After several months in the hospital in Brooklyn, I was sent to Rensselaer Polytech for a four months' course in management engineering and am now stationed at the Navy Department in Wash-

ington. I don't know how long this tour of duty will last, but I expect to be here for some time anyway. Meanwhile, I have also been appointed to the Regular Navy. There are many tales I could tell about the past few years, but I am afraid that already most of them would sound like very tall yarns indeed. Some of my experiences are so very fantastic that I really don't dare repeat them. I ran into Hap Farrell on Corregidor in February of 1942, quite by chance, without knowing he was anywhere within 10,000 miles."

Early last spring, John H. Hollomon, a captain, was awarded the Legion of Merit, his citation being for outstanding services in the field of physical metallurgy as a member of the Watertown Arsenal laboratory. He is now with the General Electric Company as a physical metallurgist in the research laboratory. — A. W. Schlechten, formerly head of the mining department at Oregon State College, who during the war engaged in research on zirconium with the United States Bureau of Mines, is now taking a position as chairman of the metallurgical department of the Missouri school of mines at Rolla, Mo. — Robert D. Macdonald, who had been research engineer at the Battelle Memorial Institute, has gone to Cambridge, where he is in the Division of Industrial Cooperation at Technology. — Jan M. vanSwaay, a lieutenant, was released on September 5, 1945, from the Hitachi prisoner-of-war camp near Tokyo. He next proceeded to Okinawa, Manila, and Balikpapan in Borneo, and was finally joined by his wife and children, and is now located in Holland. — James H. Boulger, Jr., has resumed his practice as a registered architect in Salem, Mass. — J. E. Fifield has joined the development and research division of the International Nickel Company, Inc. — Milton J. Kaplan was at a German prison camp for 15 months before he was finally liberated. — Charles S. Godfrey has been appointed to the science department at Phillips Exeter Academy.

The marriage of Alice Broun Thompson to Walter Happer Farrell took place on the 26th of November in Nashville, Tenn. — Helen Hicks Stearns became the bride of William Rogers Stern on the 29th of November in Waco, Texas. — Catherine Elizabeth Lyman and James Easby-Smith Warden were united in marriage on last June 23. — At about the same time, Ada Margaret Bausman became the bride of Chester B. Watts, Jr., in an Ohio wedding. On last June 13, Mr. Watts received the Legion of Merit for his part in developing radio devices and automatic flight-control instruments. — Christine Owen and Malcolm Clayton Allen were married in Taunton, Mass., in July. — Last spring Alice Marie Sweisfurth and James E. Watkins were married in Philadelphia. — Agnes E. Hamblen and William H. Stone were married in November. — Marilyn Smith and Harold Hershfield were joined in marriage on August 11.

Mr. and Mrs. Herbert A. Bing announced the birth of a second daughter, Judith Elaine, on last Mother's Day. Since his graduation, Mr. Bing has been employed by the Eastman Kodak Company and he was recently mentioned as the recipient of two patents for the invention of coincidence-type range finders and invert-field range finders. — Mr. and Mrs. David

Boysen Hoisington announced the arrival of Helen Bradshaw on last June 11; and Mr. and Mrs. Robert A. Bittenbender announced the arrival of Robert Piehler on June 20. — H. GARRETT WRIGHT, *General Secretary*, Garrett Construction Company, 510 Sherman Avenue, Springfield, Mo. — THOMAS F. CREAMER, *Assistant Secretary*, 6 Berkley Road, Scarsdale, N.Y.

1942

Wilfred H. Shaw, XVI, has been awarded the Bronze Star medal by President Truman for his service in the Marianas Islands. The medal, one of the few such awards granted to civilians, was presented in Tokyo on June 29. Shaw has been employed since graduation by Hamilton Standard Propellers in East Hartford, Conn. — Richard C. Gibson, VI, received his major's commission in the Regular Army last July and is now at Wright Field, Dayton, Ohio. — Donald Stein, XIII, was married to Theresa Carola of Great Kills, N.Y., on October 9. Don is a ship surveyor with the United Fruit Company.

William D. Robertson, III, is research assistant in metallurgy at M.I.T. He has been research metallurgist for the Aluminum Laboratories, Ltd., in Kingston, Ontario. — Arthur H. Pentz, II, who had been reported a prisoner of war, was liberated on April 29, 1945, and returned to the United States in good condition. — Wallace Murray, XV, is now assistant principal at the Bolles School in Jacksonville, Fla. He is also teaching mathematics. Murray has been in Florida since his return in the fall of 1945 from more than three years overseas with the Engineers.

Once again we repeat the request — please write in your news. — WARREN S. LOUD, *Acting Secretary*, Room 2-272, M.I.T., Cambridge 39, Mass.

1943

I have heard tell that brevity is the soul of wit, but these class notes are not supposed to be endless wit! How about taking a leaf out of Stan Porosky's book and following his example? He says, "I have just received the December Review, and while I still have the urge, I'll write the latest news about myself." Catch on? Stan's letter continues thus: "I arrived back in the States last July and went to work almost directly with the General Electric Company in Schenectady. I'm in the lighting division and am at present doing sales promotion work. Most important, however, is my recent engagement to Lois Stern of Brookline, Mass. We plan to be married in February."

Talking of marriage brings to mind that Hans Walz and the former Vinnette Simons were married in Poughkeepsie a few weeks ago. Vinnette is a graduate of Cortland State Teachers College. The Walzes will make their home at 5 Maple Street, Glenham, N.Y. — It seems that Frank W. Bowdish has been appointed assistant metallurgist in the research department of the Oliver Iron Mining Company at Duluth. Frank has been a research engineer at the Institute for the last three years. We have also found that Bob Reebe is a captain and a C-54 pilot. He is stationed at Nicol Field in the Philippines, where he has been now for several months. Before this he was at Tachikana, near Tokyo.

And so another set of class notes is completed, but how about reading my first paragraph again? — CLINTON C. KEMP, *General Secretary*, Barrington Court, 988 Memorial Drive, Cambridge 38, Mass.

1944 (2-44)

Your Secretary has been hounding the Institute for the past month in an effort to find out about all you men of our Class. I have been able to dig up some information on a great many of you. About 175 of the Class of 2-44 are at the Institute as undergraduates or graduates.

Those of you who did not receive your degrees in 1944 but wish to affiliate with this Class must so state in writing to the Secretary of the Alumni Association. I tried to persuade the Alumni Secretary to classify all our original members as now automatically in the Class of '44, irrespective of when they get their degrees, but this proved beyond my power. It will be necessary for each individual to inform the Institute of his wishes. For those of you who are still undergraduates and wish to join the fold, all that is necessary is to write on the card you receive before graduation, "Class of 2-44." I should like very much to get all the old boys back again, but I find that about 20 have already affiliated with other classes, perhaps because they didn't realize that it is still possible for them to belong to the Class of 2-44.

The following men will receive their degrees in February, 1947, providing they get through this term: Alexander H. Bohr, William H. Botten, Henry C. Bourne, 3d, John E. Breen, William H. Brett, Jr., James P. Buchanan, William S. Buzzard, Norman H. Callner, Francis D. Carey, Dudley F. Church, William W. Clark, John A. Cornell, Robert H. Cummings, Arthur F. Dershowitz, Wallace P. Dunlap, Jr., Lee C. Eagleton, Henry G. Gastrich, Joseph A. Henrich, Jr., DeLoss Kahl, Jr., James E. Lewis, Jr., Theodore G. Loomis, Justin M. Margolskee, George J. Maritz, Raymond E. Maritz, Jr., Alvin A. Markus, Robert L. Meier, Wayne E. Miller, James A. Neff, Arthur F. Peterson, Jr., Egidio A. Picardi, Robert B. Pietsch, Bernard Rabinowitz, William S. Richardson, Charles W. Ritterhoff, Theodore B. Roessel, Edwin G. Roos, Douglass E. Root, Jr., George Rosenblatt, Casper C. Schneider, Jr., William B. Scott, John R. Taft, Beverley B. Tucker, Lawrence J. Varnerin, Jr., Richard V. Wagner, Alden A. West.

This next list contains those who are now working for their masters' degrees at the Institute: Richard Curry, Abraham J. Goldberg, Richard J. Kulda, Anne L. Lyons, Albert Madwed, Arnold W. Martin, Alan S. Michaels, Sam G. Morrison, Garry C. Myers, Jr., Harry S. Myers, Jr., Robert Nicolait, Richard B. Palme, Felix S. Palubinskas, William H. Redlien, Jr., Peter M. Rinaldo, Geoffrey Robillard, Will B. Rodeman, James S. Ruoff, Joseph Shrier, Walter W. Turner, Richard M. Vail, Fredman J. Walcott, Jr., Seth H. Washburn, Chester L. Woodworth, Garabed Zartarian.

The following are additional names of undergraduates at M.I.T. who belong with those mentioned in last month's notes: Pierre H. Boucheron, Jr., Seth E. Bransby, John B. Breyman, 3d, Albert P. Brogle, Jr., David McC. Brown, Arthur L. Bryant (graduate, but now a senior in Course XV),

Charles R. Butler, Robert M. Byrne, Edward Chalmers, Jr., Robert I. Clarke, Robert V. Coleman, Pierre W. Dube, William C. Engelmann, John O. Glendening, Robert M. Isaacs, John F. Johnson, Leonard B. Johnson, Robert F. Kratz, Jr., Jules L. Lobsitz, Kenneth G. Lucht, William J. McCurdy, John G. Martin, Raimund F. O'Brien, Jr., Herbert L. Philpott, Nicholas Prasinis, John P. Reilly, Harry D. Robinson, Jr., George S. Saulnier, John T. Toland, Andrew M. Vallone, Lawrence S. White.

Norman T. Knapp is at home now in Royal Oak, Mich., taking it easy until the February term here opens. He was a lieutenant in the Engineers and has lately returned from the Pacific. I ran across Dean C. Picton at the Theta Chi hang-over party, and he tells me that the insurance business has caught his fancy. He is taking a course at Hartford, Conn. Frank E. Carroll is married and back at the Institute, scheduled for graduation in June. He plans to enter the Graduate Course in Business and Engineering Administration and get a master's degree. I have recently been informed that Norman Beecher is now in the Graduate School, along with Franklin C. Loesch. Stephen Knight, Jr., is also back as a junior, taking up where he left off four years ago. He is married now and living in Brookline.

William H. Brett, 3d, is married and has a baby daughter. Norman Sebell has married Ruth Horowitz, whose brother was in Course XVI. John T. Toland has announced his engagement to Dorothy Shaw of Seattle, Wash. John met Dorothy during the war, when he was stationed in that area. Jack Hardy has decided that the Army is the life and is staying in. At present, he is roping cattle down in Texas. Art Peterson, who is back at Technology, married Ronny, as you remember, and they now have a son. James Buchanan now has two girls in his family.

Paul Nelson was killed in Belgium during the Battle of the Bulge, on February 5, 1945. Langdon Flowers is working for Douglas Aircraft in California. Garry Myers, who married before graduation in 1944, now has a son and a daughter. Thomas Carmody, according to latest reports, is in the graduate school at the University of Delaware. Craig Williams is supposed to be in Japan, pulling in the dough as a civilian engineer. He got his discharge from the Army over there. Johnny White is attending Law School at night in Boston while working during the day for his brother, who is a contractor.

John Gibb, a junior grade lieutenant, was married in August upon his return from Pearl Harbor, to Ann Ward, a Cornell University graduate. Harlan Taylor, also a junior grade lieutenant, and Saunda Pease of Rochester, N.H., and Lasell Junior College were wed last April. Herb Graetz was married to Phyllis Moss last June. Robert K. McCandliss, who was reported missing in action, returned safely and is at present at the Institute in the Junior Class.

Robert L. von Berg, D.Sc., has been recently appointed to the faculty of Cornell University, after serving with the Du Pont industrial engineering division since 1944. James Garrison, an ensign, was awarded his B.S. degree and commission in the regular Coast Guard at the exercises at the Coast Guard Academy in New London,

Conn., in June. Henry Cohen, recently the youngest U.N.R.R.A. director in Germany, has returned to the United States and duties as an instructor at City College in Brooklyn. After fighting with the Ninth Infantry Division, Cohen was discharged last January and joined the United Nations Relief and Rehabilitation Administration. As commander of Camp Foehrenwald, he earned high praise from a U.N.R.R.A. spokesman. Pierre Dube was a member of an Army Field Team attempting to bring peace between the two conflicting factions in China. His wartime duties were in the China-Burma-India theater, and he has been awarded a Chinese decoration.

Nicholas Prasinis married Bessie Lingos early this summer. Al Martin, XVI, was married in January, 1946, to Dorothy Carlsen and is now living in Hempstead, Long Island, N.Y. Bob Metzger, a junior grade lieutenant, became engaged in June to Ruthe Craig of Wellesley and Katie Gibbs. At that time Bob was at Pearl Harbor on the staff of Admiral Hall, after having served 16 months in the Pacific as an intelligence officer. The wedding of Felix Palubinskas and Lucille Sewell took place on September 8. Walter Masnik was married in July to Ruth Driver, a graduate of The Chandler Schools. Charlotte Mackelvie was married to Reid Crockett in August, after having been on the faculty of the University of California. Robert Byrne was married in June to Margaret Bacon, a Wellesley graduate, and is back at the Institute after three years in the Army Signal Corps.

Leo Cravitz, a junior grade lieutenant, has recently been placed on inactive duty after two years as a Navy medical officer, serving at the Research Institute in Bethesda, Md. Ann Chapin of Salisbury, Mass., announced her engagement to Willard S. Little, Jr., of Newburyport last November. He is a former lieutenant in the Army, now employed as an industrial representative of the Shell Oil Company of New York. Doris Carter of Sharon, Mass., was married to Page S. Ufford, Jr., of Middlebury, Vt., in Mount Vernon Chapel in Boston last October. Page has only recently been discharged from the Marines, after having served as a lieutenant in the South Pacific area. Norman L. Greenman is now back at Technology as a senior. He attended the American University in Biarritz, France, during the first part of 1945, when he was a corporal. Peter S. Hopkins, a major in the Corps of Engineers, has married Cynthia Redmond of New York. He served in the China-Burma-India theater and now is back at Technology as a senior in Course XV. He was released on V-J Day from Japanese imprisonment.

Albert J. Seymour has announced his engagement to Janet Mary Smith of Brockton, Mass. He was in the Army Air Forces and now is back at the Institute as a senior. Frank Davey is now a junior grade lieutenant assigned to duty with the Naval Air Corps in which he is an instructor pilot and navigation officer instructor. Sara Ruth Reid has announced her engagement to Michael Burlingham, who was formerly a captain in the Army Air Forces. He served in the southwest Pacific for 26 months. Rowena S. Beaudry was married the first week in November to William C. Sadler, a junior grade lieutenant,

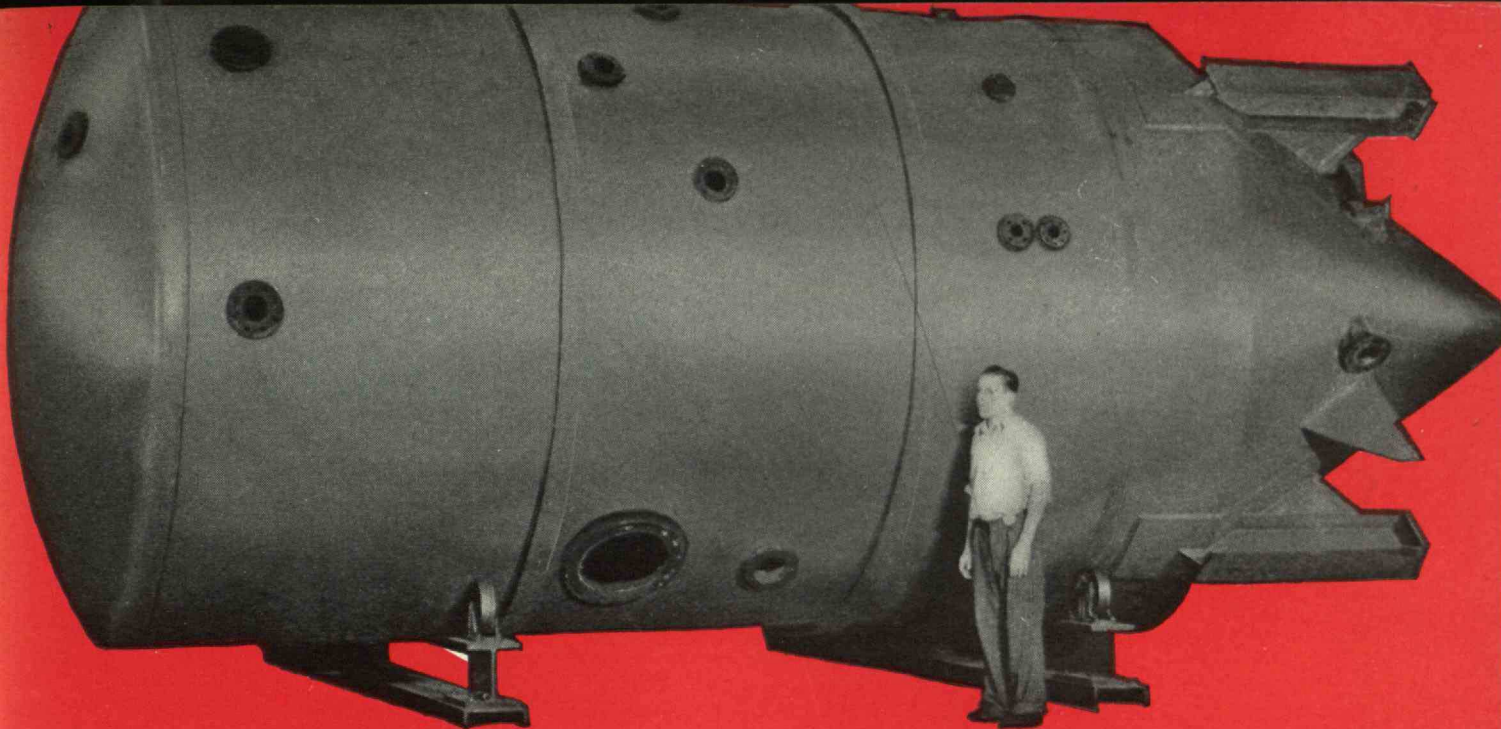
at St. Ann's Church in Spokane, Wash. Bill returned from the Pacific last April after serving 19 months and is now stationed in Washington. Marjorie Ann DesMarais married Edward C. Chapin last March in Lakewood, Ohio.

The following men were present at the Alumni Banquet held last June: Bob Arnold, Gunther Baldauf, Leva Coifman, Bob Cooper-Smith, Tom Dolan, Ed Eaton, Jim Gallivan, Rey Gamundi, Earl Hodgdon, Bob Jevon, Bob Johnson, Larry Lamadrid, Jim Mavor, Dick Mullikin, John Rockett, and Dick Whiffen.

I have a card from Ken Rehler which states that he was discharged with the rank of junior grade lieutenant last March and is now employed as an electronic research engineer at the Curtiss-Wright Corporation. His address is 1544 Richmond Avenue, Columbus, Ohio. A letter from Headquarters, United States Forces, India-Burma Theater, dated February 12, 1946, states that Alexander Bohr had been promoted to the rank of third grade technician. He was with the Theater Headquarters Ordnance section. At present he is back at Technology. A letter from Korea, dated February 25, 1946, states that George Burdick had been promoted to the rank of technical sergeant. He was with the Engineers on occupation duty. Another letter from Korea tells of Bob Bartz being on the faculty of the newly-founded XXIV Corps University as an instructor and course supervisor. He is back at the Institute with his wife, Rosemary, and their daughter.

A letter from Bob Ilfeld reports his working for a year on the atomic bomb project at Los Alamos, N.M. He was discharged from the Army at Fort Bliss, Texas, last February. Bob married Winona Rosenberg, while he was at Tech and she was at Radcliffe. He is working for a Ph.D. in Physics at the graduate school at Cal Tech. A letter from Lew Tyree, dated last March, tells of his occupation duties as chief water purification man on Iwo Jima. His rank at that time was first lieutenant in the Engineer Base Depot. Last January, 1946, he was commended by the commanding general for his work in connection with water and received the Army Commendation Ribbon for this service. Lewis is now back at the Institute, striving to get his degree next June. A letter from Bob Schwartz tells of his marriage to Kathryn E. Handloss of Sacramento, Calif. He was recently promoted to the rank of junior grade lieutenant and is now at the United States Naval Air Station at Columbus, Ohio, where he is serving as assistant electronics officer.

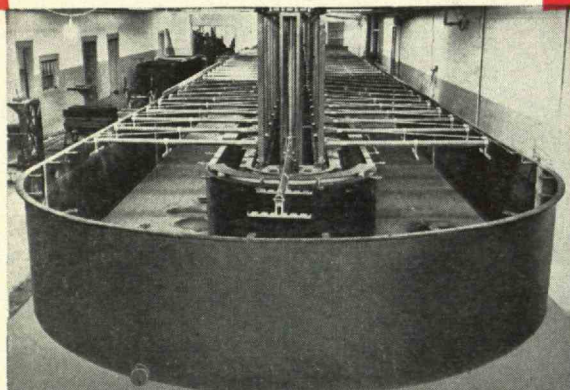
Robert A. Gillen is working for the Standard Oil Company of New Jersey. He is down at Venezuela at the present time. Arnold Mackintosh is working for the Eastman Kodak Company in Rochester, N.Y. Harry Cumpston is also working for Eastman. Warren Howard married Louise, his Wellesley flame, and they now have a son, Peter. He is working at Schenectady, N.Y., for General Electric. Richard C. Maconi is now working for a construction company in New Haven, Conn. — WILLIAM B. SCOTT, *General Secretary*, 6 Army War College, Washington, D.C. MALCOLM G. KISPERT, *Assistant Secretary*, Room 3-308, M.I.T., Cambridge 39, Mass.



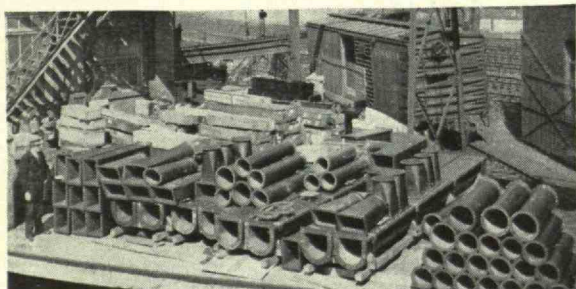
GIANT RUBBER-LINED EVAPORATOR

Evaporator or Crystallizer for use in large Rayon Plant to recover valuable crystallized chemicals from processing solution, 10'6" dia. 28' long. Lined with Manhattan Acid-Resisting Rubber. Weight approximately 30,000 lbs. Used under 29" vacuum.

You Get a "Plus" of Quality in
MANHATTAN Rubber Linings



THE WORLD'S LARGEST RUBBER-LINED NICKEL PLATING TANK, lined by Manhattan. Required 7 railroad flat cars to ship. Now in full operation with a large automatic elevator-type nickel plating conveyor.
 (Photo courtesy Hanson-Van Winkle-Munning Company)



RUBBER-LINED EQUIPMENT FOR METAL PICKLING PLANT—Spent liquor sewers, fume exhaust ducts and stacks, drain piping and fittings all lined with Manhattan Acid-Proof Rubber Lining. For use in continuous strip pickling process in large steel mill. This part-shipment weighed 15 tons.

Companies engaged in the chemical processing and storing, metal finishing, plating and related industries have contributed in making Manhattan the foremost Rubber Lining manufacturer. Manhattan Rubber Linings are widely used on tanks, filters, impellers, mixers, agitators and troughs, blowers, exhaust fans and ducts, dipping cages, vacuum crystallizers, pipe and fittings, and on other equipment in endless variety of shapes.

Your 40-Year "Plus" at Manhattan

- 1-** Experienced engineers and technique backed by 40 years of applying rubber to process handling equipment (53 years manufacturing other rubber products).
- 2-** Development of a special rubber-to-metal bond that defies mechanical separation.
- 3-** Compounding that will not crack or oxidize regardless of temperature changes and expansion or contraction of the metal.
- 4-** Utmost resistance to blows and abrasion.
- 5-** Enduring, dependable protection against corrosion and contamination.
- 6-** Elimination of stray currents.
- 7-** Extra long service and safety with resulting economies in handling most active acids, acid fumes, alkalis, salts, dye solutions and other caustic chemicals.

*Protect Your Equipment—Lower Your Operating Costs
 Consult Manhattan on corrosion and contamination jobs.*

RAYBESTOS-MANHATTAN, INC.

MANHATTAN RUBBER DIVISION

EXECUTIVE OFFICES AND FACTORIES

PASSAIC, NEW JERSEY



Thomas H. Boyd, '23

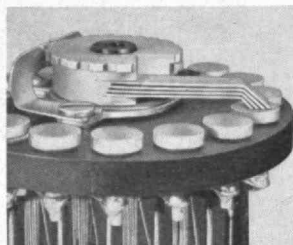
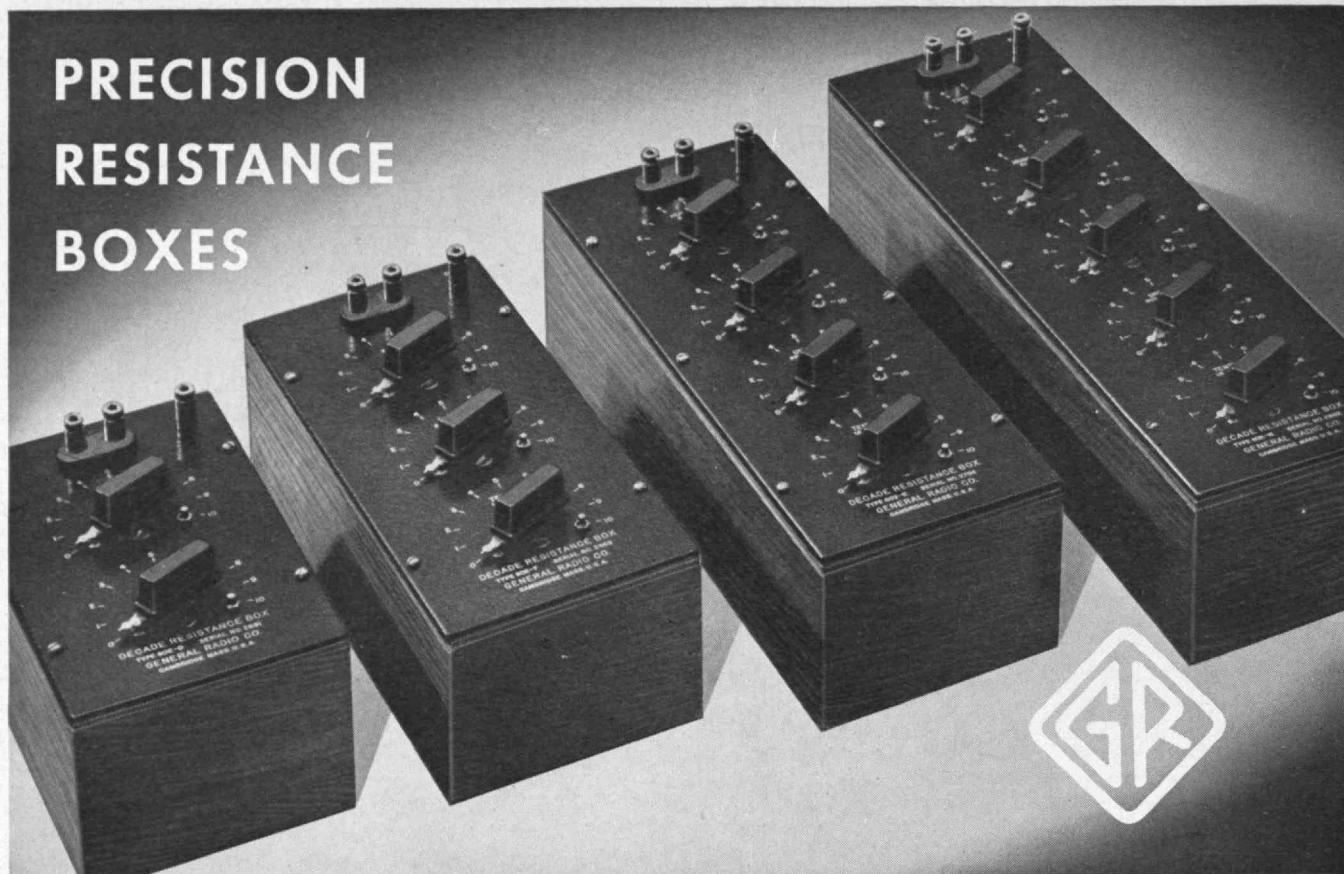
Wilder E. Perkins, '25

Charles P. McHugh, '26

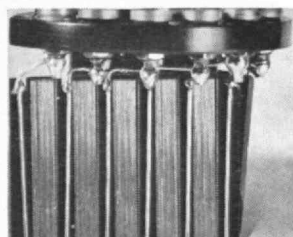
Daniel J. Hanlon, '37

Albert W. Roschke, '38

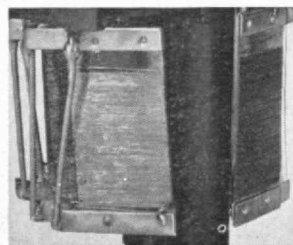
PRECISION RESISTANCE BOXES



Quadruple-leaf, phosphor-bronze switches with wiping contact. Contact surfaces ground flat. Contact resistance only 0.002 ohm. Cam-type positive detent mechanism. Entire unit shielded behind panel.



Aryton-Perry windings of the 1-, 10-, and 100-ohm decades on bakelite cards.



Unifilar windings of the 1,000 and 10,000-ohm decades on mica cards.

● The General Radio Type 602 Decade-Resistance Boxes are universally accepted as the adjustable standards of resistance in laboratories where a wide range of resistance values is required.

FEATURES

- PERMANENT CALIBRATION
- THOROUGH AGING
- ACCURATELY ADJUSTED RESISTANCE VALUES
- LOW TEMPERATURE COEFFICIENT
- LOW INDUCTANCE AND CAPACITANCE WINDINGS
- NO APPRECIABLE FREQUENCY ERROR BELOW 50 KC
- LOW AND CONSTANT CONTACT RESISTANCE
- PROTECTED WINDINGS AND SWITCHES
- POSITIVE DETENT MECHANISMS
- SHIELDED CABINETS — NO BODY CAPACITANCE
- CURRENT-CARRYING CAPACITY ENGRAVED ON EACH DECADE
- NINE SIZES BETWEEN 0.1 TO 111 OHMS AND 1 TO 111, 110 OHMS
- MODERATELY PRICED BETWEEN \$30 and \$80

WE HAVE A FEW IN STOCK!

Write for Detailed Information and Complete Specifications

GENERAL RADIO COMPANY

275 MASSACHUSETTS AVENUE

CAMBRIDGE, MASSACHUSETTS

BRANCHES: 90 West St., New York 6, 920 S. Michigan Ave.,
Chicago 5, 950 N. Highland Ave., Los Angeles 38